1449/1
Matematik
Kertas 1
Oktober 2021
$1\frac{1}{2}$ jam

KEMENTERIAN PENDIDIKAN MALAYSIA
PEJABAT PENDIDIKAN DAERAH PASIR GUDANG

MODUL PEPERIKSAAN PERCUBAAN SPM 2021
SET 2

MATEMATIK
Kertas 1
Satu jam tiga puluh minit

JANGAN BUKA MODUL INI SEHINGGA DIBERITAHU

1. *Modul ini mengandungi* 40 *soalan dalam dwibahasa.*
2. *Jawab semua soalan.*
3. *Rajah yang mengiringi soalan tidak dilukis mengikut skala kecuali dinyatakan.*
4. *Satu senarai rumus disediakan di halaman* 2 *dan* 3.
5. *Anda dibenarkan menggunakan kalkulator saintifik.*

RUMUS MATEMATIK

MATHEMATICAL FORMULAE

Rumus-rumus berikut boleh membantu anda untuk menjawab soalan. Simbol-simbol yang diberi adalah yang biasa digunakan.

The following formulae may be helpful in answering the questions. The symbols given are the ones commonly used

PERKAITAN

RELATIONS

1 $a^m \times a^n = a^{m+n}$

2 $a^m \div a^n = a^{m-n}$

3 $(a^m)^n = a^{mn}$

4 $A^{-1} = \frac{1}{ad-bc}\begin{pmatrix} d & -b \\ -c & a \end{pmatrix}$

5 Jarak / *Distance* = $\sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$

6 Titik Tengah / *midpoint* $(x, y) = \left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$

7 Purata laju = $\frac{\text{jarak yang dilalui}}{\text{masa yang diambil}}$

Average speed = $\frac{\textit{distance travelled}}{\textit{time taken}}$

8 Min = $\frac{\text{hasil tambah nilai data}}{\text{bilangan data}}$

Mean = $\frac{\textit{sum of data}}{\textit{number of data}}$

9 Min = $\frac{\text{hasil tambah (nilai titik tengah kelas} \times \text{kekerapan)}}{\text{hasil tambah kekerapan}}$

$Mean = \frac{sum\,of\ (midpoint \times frequency)}{sum\,of\ frequencies}$

10 Varians / *Variance*, $\sigma^2 = \frac{\Sigma(x-\bar{x})^2}{N} = \frac{\Sigma x^2}{N} - \bar{x}^2$

11 Varians / *Variance*, $\sigma^2 = \frac{\Sigma f(x-\bar{x})^2}{\Sigma f} = \frac{\Sigma f x^2}{\Sigma f} - \bar{x}^2$

12 Sisihan piawai / *Standard deviation*, $\sigma = \sqrt{\frac{\Sigma(x-\bar{x})^2}{N}} = \sqrt{\frac{\Sigma x^2}{N} - \bar{x}^2}$

13 Sisihan piawai / *Standard deviation*, $\sigma = \sqrt{\frac{\Sigma f(x-\bar{x})^2}{\Sigma f}} = \sqrt{\frac{\Sigma f x^2}{\Sigma f} - \bar{x}^2}$

14 TeoremPithagoras/*Pythagoras Theorem*

$c^2 = a^2 + b^2$

15 $P(A) = \frac{n(A)}{n(S)}$

16 $P(A') = 1 - P(A)$

17 $m = \frac{y_2-y_1}{x_2-x_1}$

18 $m = -\frac{\text{pintasan-}y}{\text{pintasan-}x}$

$m = -\frac{y\text{-intercept}}{x\text{-intercept}}$

19 Faedah mudah / Simple interest, *I* =*Prt*

20 Nilai matang / *Maturity value*

$MV = P\left(1+\frac{r}{n}\right)^{nt}$

21 Jumlah bayaran balik / *Total amount payable*

A = *P* + Prt

BENTUK DAN RUANG
SHAPES AND SPACE

1 Luas trapezium = $\frac{1}{2}$×hasil tambah dua sisi selari×tinggi

Area of trapezium = $\frac{1}{2} \times sum\ of\ parallel\ sides \times height$

2 Lilitan bulatan = $\pi d = 2\pi j$
Circumference of circle = $\pi d = 2\pi r$

3 Luas bulatan = πj^2
Area of circle = πr^2

4 Luas permukaan melengkung silinder = $2\pi jt$
Curved surface area of cylinder = $2\pi rh$

5 Luas permukaan sfera = $4\pi j^2$
Surface area of sphere = $4\pi r^2$

6 Isipadu prisma tegak = Luas keratan rentas×panjang
Volume of right prism = cross sectional area×length

7 Isipadu silinder = $\pi j^2 t$
Volume of cylinder = $\pi r^2 h$

8 Isipadu kon = $\frac{1}{3}\pi j^2 t$

Volume of cone = $\frac{1}{3}\pi r^2 h$

9 Isipadu sfera = $\frac{4}{3}\pi j^3$

Volume of sphere = $\frac{4}{3}\pi r^3$

10 Isipadu piramid tegak = $\frac{1}{3} \times$ luas tapak × tinggi

Volume of right pyramid = $\frac{1}{3} \times base\ area \times height$

11 Hasil tambah sudut pedalaman poligon = $(n - 2) \times 180^\circ$
Sum of interior angles of a polygon = $(n - 2) \times 180^\circ$

12 $$\frac{\text{panjang lengkok}}{\text{lilitan bulatan}} = \frac{\text{sudut pusat}}{360^\circ}$$
$$\frac{arc\ length}{circumference\ of\ circle} = \frac{angle\ subtended\ at\ centre}{360^\circ}$$

13 $$\frac{\text{luas sektor}}{\text{luas bulatan}} = \frac{\text{sudut pusat}}{360^\circ}$$
$$\frac{area\ of\ sector}{area\ of\ circle} = \frac{angle\ subtended\ at\ centre}{360^\circ}$$

14 Faktor skala, $k = \frac{PA'}{PA}$

Scale factor, $k = \frac{PA'}{PA}$

15 Luas imej = k^2×luas objek
Area of image = k^2×*area of object*

Jawab **semua** soalan.
*Answer **all** questions*.

1. Menara Berkembar Petronas adalah Menara berkembar tertinggi di dunia iaitu dengan ketinggian 452 meter. Tukarkan 452_{10} kepada asas sembilan.
Petronas Twin Towers is the tallest twin tower in the world with a height of 452 meters. *Convert* 452_{10} *to base nine.*

A 255_9
B 552_9
C 525_9
D 252_9

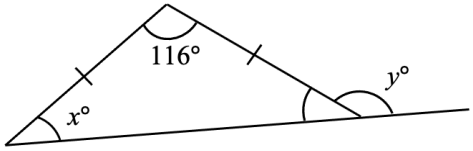
2. Hitung nilai bagi $3251_6 - 1413_6$.
Calculate the value of $3251_6 - 1413_6$.

A 1443_6
B 1738_6
C 1233_6
D 1434_6

3. Rahman akan menduduki peperiksaan SPM pada tahun ini. Dia telah tetapkan untuk membuat latihan matematik selama dua jam untuk setiap hari. Jika Rahman berjaya menjawab satu soalan dalam masa lima minit, hitung jumlah soalan yang berjaya dijawab oleh Rahman dalam masa 15 hari dan nyatakan dalam bentuk piawai.
Rahman will sit for the SPM examination this year. He has set out to do two hours of math practice for each day. If Rahman successfully answers one question in five minutes, calculate the number of questions that Rahman successfully answered in 15 *days and state in standard form.*

A 3.6×10^2
B 3.6×10
C 2.4×10
D 2.4×10^2

4. Rajah 1 di bawah menunjukkan sebuah segitiga.
Diagram 1 *below shows a triangle.*

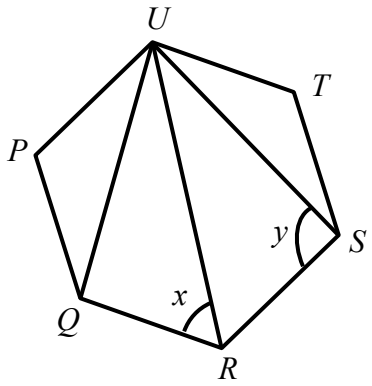


Rajah 1
Diagram 1

Hitung nilai bagi $x° + y°$.
Calculate the value of $x° + y°$.

A 32°
B 64°
C 148°
D 180°

5. Rajah 2 menunjukkan sebuah heksagon sekata *PQRSTU*.
Diagram 2 *shows a regular hexagon PQRSTU.*

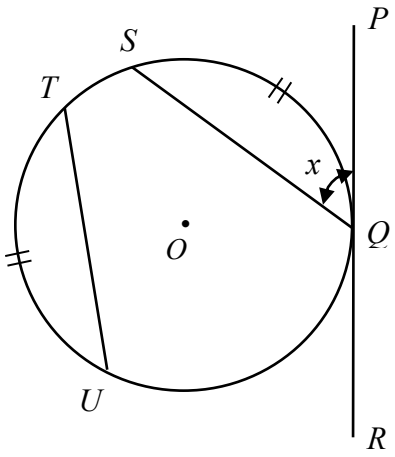


Rajah 2
Diagram 2

Cari nisbah nilai *x* kepada nilai *y*.
Find the ratio of the value of x to the value of y.

A 1 : 2
B 1 : 3
C 1 : 4
D 2 : 3

6. Dalam rajah 3, *PQR* ialah tangen kepada bulatan *QSTU* dengan pusat *O* di *Q*. $\angle SQP = x°$.
In Diagram 3*, PQR is a tangent to circle QSTU with centre O, at Q.* $\angle SQP = x°$.

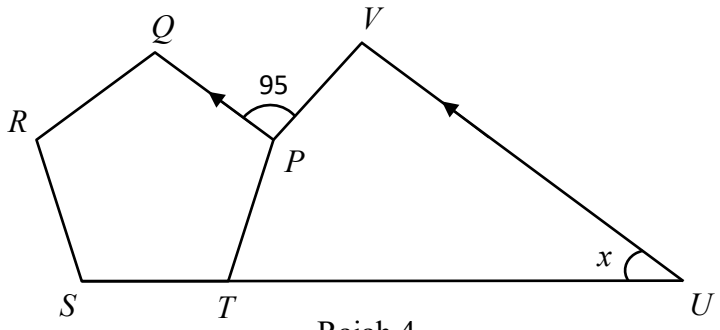


Rajah 3
Diagram 3

Diberi lengkok *TU* = lengkok *SQ*. Nyatakan $\angle TUO$.
Given that arc TU = arc SQ. State $\angle TUO$.

A $90 - x$
B $90 - \frac{x}{2}$
C $180 - x$
D $180 - \frac{x}{2}$

7. Rajah 4 menunjukkan pentagon sekata *PQRST* dan sisi empat, *PTUV*. *STU* ialah garis lurus.
Diagram 4 *shows a regular pentagon PQRST and a quadrilateral, PTUV. STU is a straight line.*



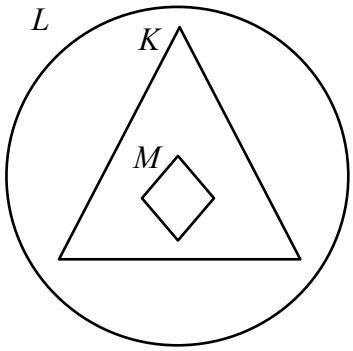
Rajah 4
Diagram 4

Cari nilai *x*.
Find the value of x.

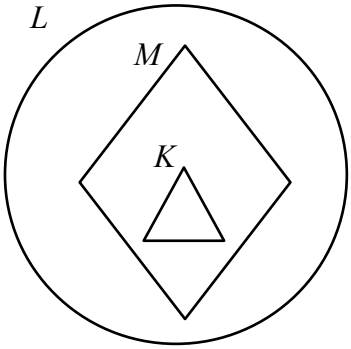
A 36
B 54
C 60
D 70

8. Diberi set semesta, $\xi = K \cup L \cup M$, $K \subset M$ dan $M \not\subset L$.
Gambar rajah Venn yang manakah mewakili maklumat itu?
It is given the universal set, $\xi = K \cup L \cup M$, $K \subset M$ *and* $M \not\subset L$.
Which Venn diagram represents the information?

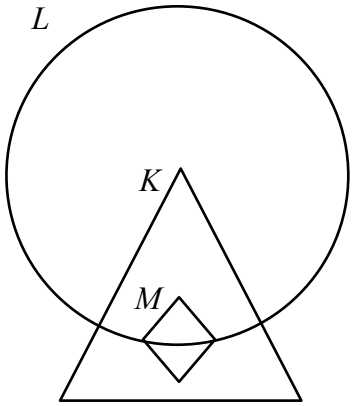
A



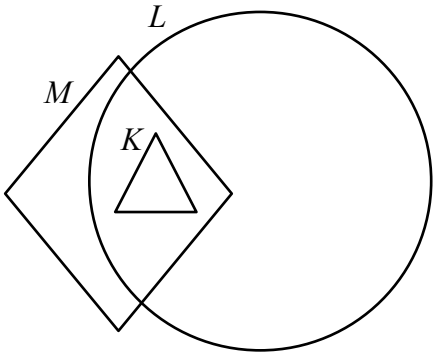
B



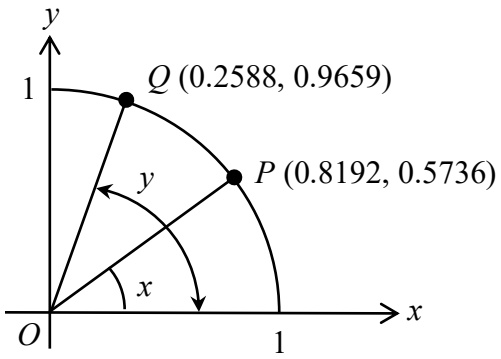
C



D



9. Dalam Rajah 5, titik *P* dan titik *Q* terletak pada lengkok suatu bulatan unit berpusat *O*
In Diagram 5*, point P and point Q lie on the arc of a unit circle with centre O.*

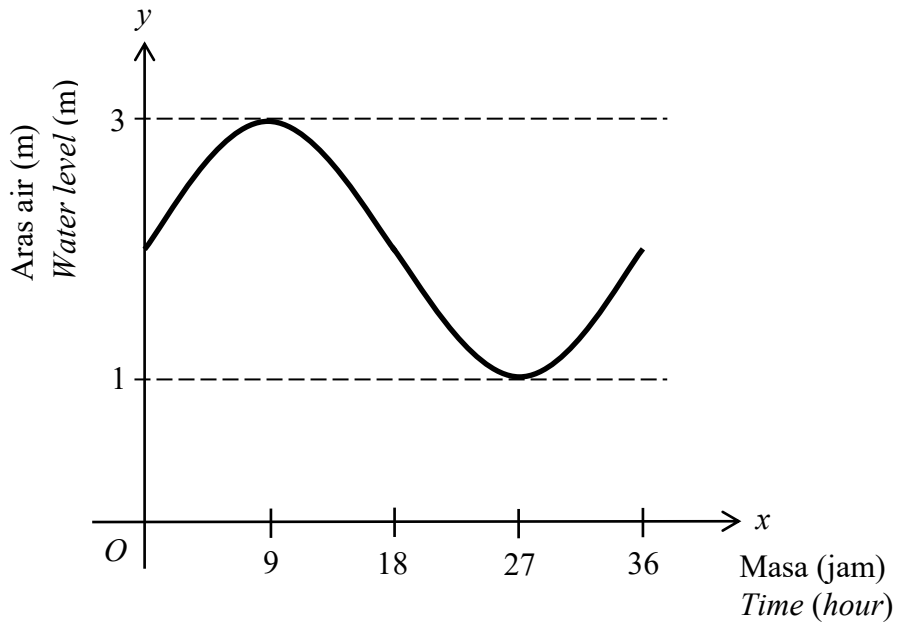


Rajah 5
Diagram 5

Cari nilai kos $x°$ + sin $y°$.
Find the value of cos $x°$ + sin $y°$.

A 0.8324
B 1.078
C 1.5395
D 1.7851

10. Rajah 6 menggambarkan aras air yang direkodkan di sebuah pelabuhan. Diberi *y* mewakili aras air, dalam m, dan *x* mewakili masa, dalam jam.
Nyatakan fungsi trigonometri bagi graf tersebut dalam bentuk $y = a \sin bx + c$.
Diagram 6 *depicts the water level recorded at a port. It is given that y represents the water level, in m, and x represents time, in hours.*
State the trigonometric function of the graph in the form of $y = a \sin bx + c$.



Rajah 6
Diagram 6

A $y = 2 \sin 10x + 1$
B $y = 2 \sin 9x + 1$
C $y = \sin 10x + 2$
D $y = \sin 9x + 2$

11. Encik Ravi menyimpan wang sebanyak RM9 600 di Bank Ceria dengan kadar faedah 4% setahun. Berapakah faedah yang diperolehi oleh Encik Ravi selepas 6 bulan?
Mr. Ravi keeps RM9 600 *in Bank Ceria with an interest rate of* 4% *per annum. How much interest does Mr. Ravi get after* 6 *months?*

A RM 576
B RM 384
C RM 192
D RM 144

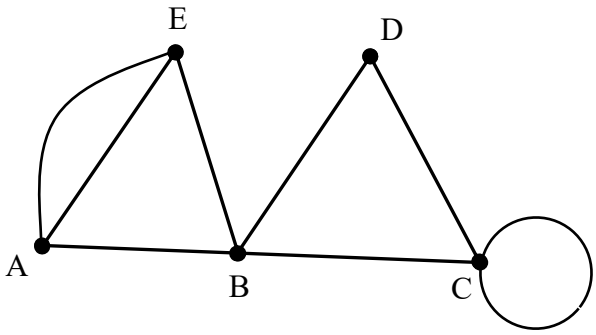
12. Encik Chong menerima penyata kad kredit untuk bulan Mei 2021 dari Bank Setia. Penyata menunjukkan Encik Chong mempunyai baki tertunggak sebanyak RM4 500. Berapakah bayaran minimum yang harus dibayar oleh Encik Chong?
Mr. Chong received a credit card statement for May 2021 *from Bank Setia. The statement shows that Mr. Chong has outstanding balance about* RM4 500*. What is the minimum payment need to be paid by Mr. Chong?*

A RM 450
B RM 225
C RM 180
D RM 67.50

13. Diberi $x = 2$ ialah paksi simetri bagi fungsi kuadratik $f(x) = 2x^2 - 8x - 7$.
Tentukan koordinat titik minimum bagi fungsi kuadratik ini.
Given that $x = 2$ *is the axis of symmetry of the quadratic function* $f(x) = 2x^2 - 8x - 7$.
Determine the coordinates of minimum point for this quadratic function.

A (2, - 7)
B (2, - 8)
C (2, - 13)
D (2, - 15)

14. Rajah 7 di bawah menunjukkan graf yang mempunyai gelung dan berbilang tepi.
Diagram 7 below shows a graph with a loop and multiple edges.

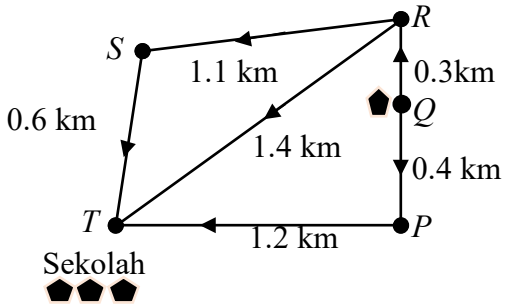


Rajah 7
Diagram 7

Tentukan bilangan tepi dan bilangan darjah bagi graf tersebut.
Determine the number of edges and the sum of degrees of the graph.

A $n(E) = 8, \Sigma d(v) = 16$
B $n(E) = 8, \Sigma d(v) = 15$
C $n(E) = 7, \Sigma d(v) = 15$
D $n(E) = 7, \Sigma d(v) = 14$

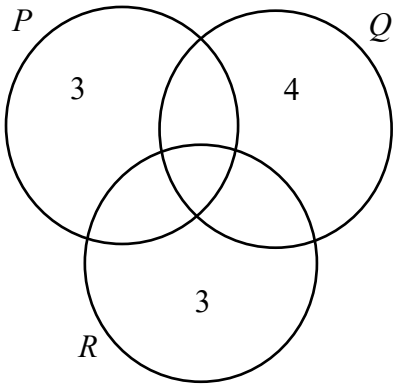
15. Rajah 8 menunjukkan graf terarah dari rumah Faris di *Q*, ke sekolah di *T*. Tentukan laluan terbaik yang dipilih oleh Faris untuk ke sekolah dengan mengambil kira jarak terpendek.
Diagram 8 shows a directed graph from Faris's house in Q to the school in T. Determine the best route Faris chooses go to school taking the shortest distance.



Rajah 8
Diagram 8

A $Q \rightarrow R \rightarrow T$
B $Q \rightarrow P \rightarrow T$
C $Q \rightarrow R \rightarrow S \rightarrow T$
D $Q \rightarrow R \rightarrow P \rightarrow T$

16. Rajah 9 ialah gambar rajah Venn yang menunjukkan bilangan murid yang terlibat dalam suatu gotong-royong.
Diagram 9 *is a Venn diagram that shows the number of students involved in a gotong-royong.*



Rajah 9
Diagram 9

Diberi bahawa set semesta, $\xi = P \cup Q \cup R$,
Set P = {murid bertugas di blok P},
Set Q = {murid bertugas di blok Q} dan
Set R = {murid bertugas di blok R}.

Jumlah murid yang terlibat dalam aktiviti gotong-royong ini ialah seramai 28 orang. Jika bilangan murid yang ditugaskan di mana-mana dua blok adalah sama dan tiada murid yang ditugaskan di ketiga-tiga blok, cari bilangan murid yang bertugas di blok R.

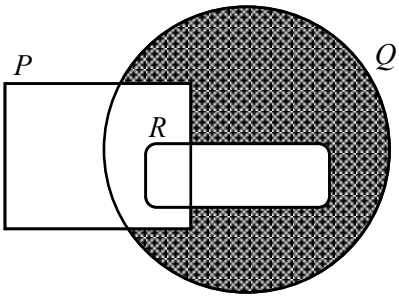
It is given that the universal set, $\xi = P \cup Q \cup R$,
Set P = {*student assigned to block* P},
Set Q = {*student assigned to block* Q} *and*
Set R = {*student assigned to block* R}.

The total number of students involved in this gotong-royong is 28. *If the number students assigned to any two blocks is the same and there is no student assigned to all three blocks, find the number of students assigned to block R.*

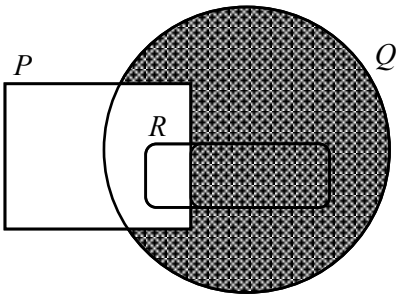
A 12
B 13
C 15
D 18

17. Diberi bahawa set semesta, $\xi = P \cup Q \cup R$. Antara berikut, rajah Venn yang manakah mewakili $P' \cup R$?
Given that the universal set, $\xi = P \cup Q \cup R$. which of the following Venn diagrams represent $P' \cup R$?

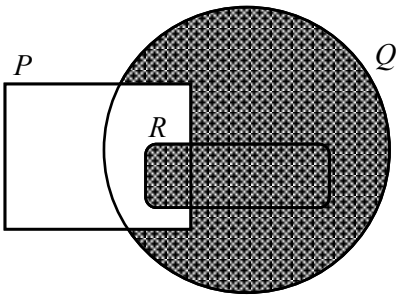
A



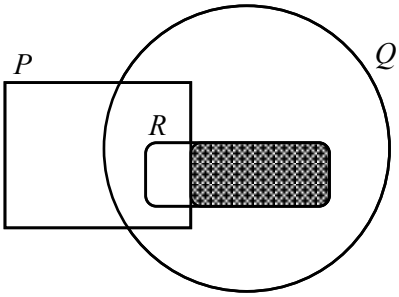
B



C



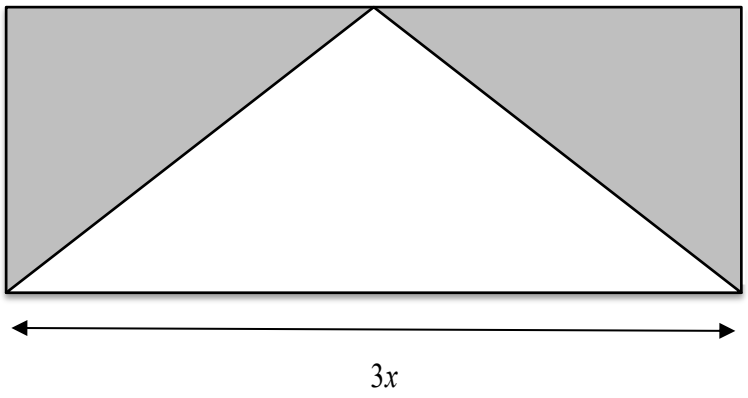
D



18. Hitung nilai $\sqrt{160}$ dan nyatakan jawapan betul kepada dua tempat perpuluhan.
Calculate the value of $\sqrt{160}$ *and state the correct answer to two decimal places.*

A 12.00
B 12.64
C 12.65
D 12.649

19. Rajah 10 menunjukkan dinding berbentuk segi empat tepat. Luas sebuah dinding berbentuk segi empat tepat ialah $(3x^2 + 9x)$ meter persegi. Dinding tersebut ingin dilukis corak geometri seperti rajah di bawah dan akan dicat mengikut bentuk geometrinya. Jika lebar dinding itu ialah $3x$ meter dan dua segi tiga bersudut tegak yang sama saiz itu ingin dicat dengan warna kelabu, berapakah luas kawasan yang akan dicat selain warna kelabu?
Diagram 10 *shows a rectangular wall. The area of a rectangular wall is* $(3x^2 + 9x)$ *square meters. The wall will be painted in geometric pattern according to the shape of the geometry such as the diagram below. If the width of the wall is* $3x$ *meters and two upright-angled triangles of the same size is painted in grey, calculate the area which is painted in a different colour than grey.*



Rajah 10 / *Diagram* 10

A $3x^2$
B $x + 3$
C $3x + 9$
D $1.5x^2 + 4.5x$

20. Diberi y = $\sqrt{\frac{x-4}{3x}}$, maka x =

Given that $y = \sqrt{\frac{x-4}{3x}}$, *then* x =

A $-\frac{4}{3y^2-1}$

B $-\frac{4}{1-3y^2}$

C $3y + 4$

D $\frac{3y^2}{4}$

21. $6m^3 \times 2m^2 =$

A $8m^5$

B $8m^6$

C $12m^5$

D $12m^6$

22. Permudahkan $\left(4^{\frac{3}{2}} \div 2^4 \times 2^{-2}\right)^3$.

Simplify $\left(4^{\frac{3}{2}} \div 2^4 \times 2^{-2}\right)^3$

A 2^{-9}

B 2^{-3}

C 2^3

D 2^9

23. $9x^2y^6 \div 27y^2 \times 3x^2 =$

A x^4y^4
B x^5y^8
C $\frac{1}{3}x^3y^4$
D $\frac{1}{3}x^5y^8$

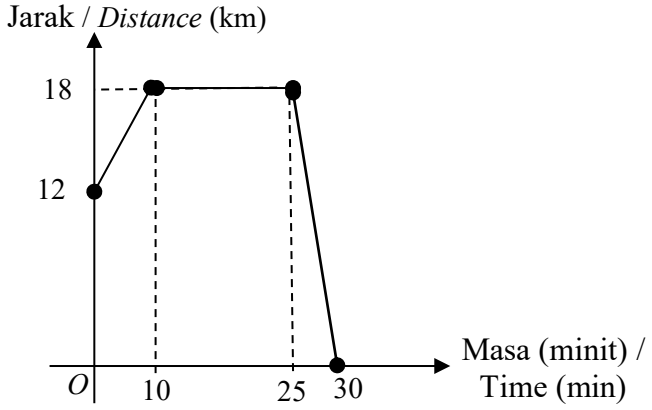
24. Harga sebuah majalah lama yang dilelong ialah RMy. Zafran membeli 6 buah majalah dengan jumlah bayaran RM15. Bentuk persamaan linear dalam satu pemboleh ubah yang manakah yang tepat bagi pernyataan tersebut.
The price of an old magazine being auctioned is RMy. Zafran bought 6 magazines for a total payment of RM15. Form a linear equation in one variable which is accurate for the statement.

A $y = 15$
B $6y = 15$
C $15y = 6$
D $90y = 15$

25. Helmi membeli n bungkus gula-gula yang berharga RM1.60 setiap bungkus. Dia membayar RM20 dan menerima baki lebih daripada RM4. Binakan satu ketaksamaan untuk n.
Helmi bought n packets of sweets that cost RM1.60 each. He paid RM20 and received a balance that was more than RM4. Form an inequality for n.

A $n \geq 10$
B $n > 10$
C $n \leq 10$
D $n < 10$

26. Rajah 11 menunjukkan graf jarak-masa bagi sebuah kereta dalam tempoh 30 minit. Cari tempoh, dalam minit, di mana kereta itu pegun.
Diagram 11 *shows the distance-time graph of a car for a period of* 30 *minutes. Find the period of time, in minutes, during which the car is stationary.*

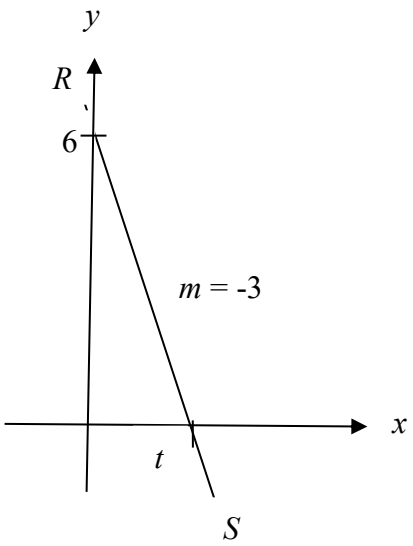


Rajah 11
Diagram 11

A 10
B 15
C 25
D 30

27. Dalam Rajah 12, *RS* ialah garis lurus. Diberi bahawa kecerunan bagi garis lurus *RS* ialah –3. Cari nilai bagi *t*.

In Diagram 12*, RS is a straight line. Given the gradient of the straight line RS is* –3. *Find the value of t.*



Rajah 12
Diagram 12

A 2
B 3
C 4
D 6

28. Tentukan koordinat bagi imej M(5 , 7) di bawah translasi $\begin{pmatrix} 2 \\ -4 \end{pmatrix}$.

Determine the coordinate for image M(5 , 7) *under the translation* $\begin{pmatrix} 2 \\ -4 \end{pmatrix}$.

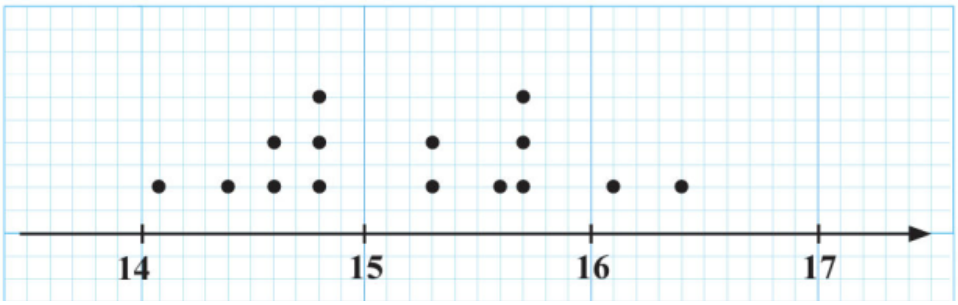
A *M'* (3 , 3)
B *M'* (1 , 9)
C *M'* (7 , 3)
D *M'* (3 , 11)

29. Data di bawah menunjukkan jumlah perbelanjaan bagi 10 orang murid darjah 1 dalam satu hari. Tentukan median bagi perbelanjaan mereka.
The data below shows the total expenditure for 10 *primary* 1 *students in one day. Determine the median of their expenses.*

RM 2	RM 3	RM 4	RM 2	RM 4	RM 2	RM 2	RM 3	RM 5	RM 3

A RM 2
B RM 3
C RM 4
D RM 5

30. Rajah 13 menunjukkan plot titik bagi kepanjangan, dalam cm, beberapa jenis sampel ikan peliharaan air tawar.
Diagram 13 *shows a point plot for the length, in* cm*, of some types of freshwater pet fish samples.*



Panjang (cm) / *Length* (cm)

Rajah 13
Diagram 13

Apakah beza panjang, dalam mm, antara sampel ikan terpanjang dan sampel ikan terpendek?
What is the difference in length, in mm*, between the longest fish sample and the shortest fish sample?*

A 2.3
B 2.4
C 23
D 24

31. Jadual 1 menunjukkan bilangan gol yang diperoleh oleh 20 pemain bola jaring dalam satu permainan. Tentukan sisihan piawai bagi taburan ini.
Table 1 *shows the number of goals scored by* 20 *netball players in one game. Determine the standard deviation of this distribution.*

Bilangan gol *Number of goals*	0	1	2	3	4
Bilangan pemain *Number of players*	3	5	6	5	1

Jadual 1
Table 1

A 1.122
B 1.26
C 5.56
D 8.8

32. Antara berikut yang manakah kunci komponen matlamat kewangan?
Which of the following is a key component of financial goals?

I. Khusus.
Spesific.
II. Tidak boleh diukur.
Measureless.
III. Boleh dicapai.
Attainable.
IV. Realistik.
Realistic.

A I, II dan / *and* III
B I, II dan / *and* IV
C I, III dan / *and* IV
D II, III dan / and IV

33. Pendapatan aktif Puan Dila ialah RM2 300. Perbelanjaan tetap dan perbelanjaan tidak tetapnya masing-masing ialah RM3 650 dan RM1 350. Berapakah pendapatan pasif Puan Dila supaya aliran tunai dalam bulan itu adalah positif?
An active income of Puan Dila is RM2 300. *Her fixed expenses and variable expenses are* RM3 650 *and* RM1 350 *respectively. What is the passive income of Puan Dila so the cash flow of the month is positive?*

A RM 2300
B RM 2500
C RM 2700
D RM 2900

34. Jadual 2 di bawah menunjukkan kadar premium tahunan bagi setiap RM 1000 nilai muka insurans sementara boleh baharu tahunan yang ditawarkan oleh Syarikat Insurans ZZ.
Table 2 *shows the annual premium rate per* RM1 000 *face value of a yearly renewable term insurance offered by Syarikat Insurans ZZ.*

Umur *Age*	Lelaki / *Male* (RM)		Perempuan / *Female* (RM)	
	Bukan perokok *Non-smoker*	Perokok *Smoker*	Bukan perokok *Non-smoker*	Perokok *Smoker*
34	2.09	2.68	1.42	1.75
35	2.15	2.74	1.47	1.80
36	2.21	2.80	1.52	1.85

Jadual 2
Table 2

Nyatakan dua faktor yang menyebabkan kenaikan kadar premium berdasarkan jadual tersebut.
State two factors that cause the increase in premium rate based on the table.

I. Umur.
Age.
II. Bukan Perokok.
Non-smoker.
III. Perokok.
Smoker.
IV. Kadar Premium.
Premium rate.

A I dan / *and* II
B I dan / *and* III
C I dan / *and* IV
D II dan / *and* IV

35. Jadual 3 di bawah menunjukkan Encik Jonathan menginsuranskan rumahnya dengan insurans kebakaran.
Table 3 *below shows that Mr Jonathan insured his house with fire insurance.*

Nilai boleh insurans rumahnya *His house insurable value*	RM 420000
Ko-insurans *Co-insurance*	80 % daripada nilai boleh insurans rumahnya. 80 % *of his house's insurable value.*
Deduktibel *Deductible*	RM 5000

Jadual 3
Table 3

Dia menginsuranskan rumahnya dengan jumlah insurans yang diperlukan. Hitung jumlah pampasan yang diterima oleh Encik Jonathan jika rumahnya musnah sepenuhnya.
He insured his house at the amount of required insurance. Calculate the compensation amount received by Mr Jonathan if his house is completely burnt down.

A RM 331000
B RM 336000
C RM 378000
D RM 415000

36. Satu nombor dipilih secara rawak daripada set S : { 3, 5, 9, 12, 16, 25, 27, 29 }. Cari kebarangkalian bahawa nombor yang dipilih itu ialah kuasa dua sempurna.
A number is chosen at random from set S : { 3, 5, 9, 12, 16, 25, 27, 29 }. *Find the probability that the number chosen is a perfect square.*

A $\frac{3}{8}$
B $\frac{1}{2}$
C $\frac{3}{4}$
D $\frac{5}{8}$

37. Anggaran sewa bulanan rumah Encik Azman ialah RM670 dan kadar cukai pintu ialah 6%. Hitung cukai pintu yang perlu dibayar oleh Encik Azman untuk setengah tahun.
Estimation of monthly rental of Mr Azman's house is RM670 *and the property assessment tax rate is* 6%. *Calculate the property assessment tax payable by Mr Azman for each half-year.*

A RM 482.40
B RM 402.00
C RM 284.00
D RM 241.20

38. Jadual 4 di bawah menunjukkan beberapa nilai pemboleh ubah *x* dan *y* dengan keadaan *y* berubah secara songsang dengan punca kuasa dua *x*.
Table 4 *below shows some values of the variable x and y where y varies inversely as the square root of x.*

x	25	100
y	2	1

Jadual 4
Table 4

Cari hubungan anatara *x* dan *y*.
Find the relationship between x and y.

A $y = 10\sqrt{x}$
B $y = \frac{10}{\sqrt{x}}$
C $y = 25\sqrt{x}$
D $y = \frac{25}{\sqrt{x}}$

39. Diberi bahawa x berubah secara langsung dengan kuasa tiga y dan secara songsang dengan punca kuasa dua z dan $x = \frac{1}{4}$ apabila $y = 2$, $z = 64$. Ungkapkan x dalam sebutan x dan z.
It is given that x varies directly as the cube of y and inversely as the square root of z and $x = \frac{1}{4}$ *when* $y = 2$, $z = 64$. *Express x in terms of y and z.*

A $x = \frac{4y^3}{\sqrt{z}}$

B $x = \frac{1}{4}y^3z^{\frac{1}{2}}$

C $x = \frac{y^2}{4z^{\frac{1}{2}}}$

D $x = \frac{y^3}{4z^{\frac{1}{2}}}$

40. $\begin{pmatrix} 4 & 6 \\ 3 & 1 \end{pmatrix} + 2\begin{pmatrix} 5 & 2 \\ -2 & 3 \end{pmatrix} - \begin{pmatrix} -1 & -5 \\ 8 & 4 \end{pmatrix} =$

A $\begin{pmatrix} 10 & 3 \\ -7 & 0 \end{pmatrix}$

B $\begin{pmatrix} 10 & 13 \\ -7 & 0 \end{pmatrix}$

C $\begin{pmatrix} 15 & 15 \\ -9 & 3 \end{pmatrix}$

D $\begin{pmatrix} 15 & 5 \\ -9 & 3 \end{pmatrix}$

KERTAS SOALAN TAMAT
END OF QUESTION PAPER

1449/1
Matematik
Kertas
Oktober 2021
$1\frac{1}{2}$ jam

MODUL PEPERIKSAAN PERCUBAAN SPM 2021

SET 2

MATEMATIK

Kertas 1

Satu jam tiga puluh minit

PERATURAN PEMARKAHAN SET 2

PEPERIKSAAN PERCUBAAN SPM 2021

PEPERIKSAAN PERCUBAAN SPM 2021

`

SET 2

MATEMATIK 1449/1

JAWAPAN

No. Soalan	Jawapan	No. Soalan	Jawapan	No. Soalan	Jawapan	No. Soalan	Jawapan
1	B	**11**	C	**21**	C	**31**	A
2	D	**12**	B	**22**	A	**32**	C
3	A	**13**	D	**23**	A	**33**	D
4	D	**14**	A	**24**	B	**34**	B
5	D	**15**	B	**25**	D	**35**	A
6	A	**16**	C	**26**	B	**36**	A
7	A	**17**	C	**27**	A	**37**	D
8	D	**18**	C	**28**	C	**38**	B
9	D	**19**	D	**29**	B	**39**	D
10	C	**20**	A	**30**	C	**40**	C

Matematik
Kertas 2
Oktober 2021
2 ½ jam

NAMA :

TINGKATAN :

KEMENTERIAN PENDIDIKAN MALAYSIA
PEJABAT PENDIDIKAN DAERAH PASIR GUDANG

MODUL PEPERIKSAAN PERCUBAAN SPM 2021 SET 2

MATEMATIK
Kertas 2
Dua jam tiga puluh minit

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1. *Modul ini mengandungi tiga bahagian:* **Bahagian A, Bahagian B** *dan* **Bahagian C**. *Jawab* **semua** *soalan daripada* **Bahagian A, Bahagian B** *dan* **satu** *soalan dalam* **Bahagian C.**

2. *Jawapan hendaklah ditulis dengan jelas dalam ruang yang disediakan dalam modul. Tunjukkan langkah-langkah penting. Ini boleh membantu anda untuk mendapatkan markah.*

3. *Rajah yang mengiringi modul tidak dilukis mengikut skala kecuali dinyatakan.*

4. *Satu senarai rumus disediakan di halaman 2 & 3.*
5. *Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogram.*

Pemeriksa			
Bahagian	**Soalan**	**Markah Penuh**	**Markah Diperoleh**
A (40m)	**1**	**3**	
	2	**4**	
	3	**4**	
	4	**5**	
	5	**4**	
	6	**3**	
	7	**4**	
	8	**4**	
	9	**4**	
	10	**5**	
B (45m)	**11**	**8**	
	12	**9**	
	13	**9**	
	14	**9**	
	15	**10**	
C (15m)	**16**	**15**	
	17	**15**	
Jumlah (100m)			

Modul ini mengandungi 31 halaman bercetak

RUMUS MATEMATIK

MATHEMATICAL FORMULAE

Rumus-rumus berikut boleh membantu anda untuk menjawab soalan. Simbol-simbol yang diberi adalah yang biasa digunakan.

The following formulae may be helpful in answering the questions. The symbols given are the ones commonly used

PERKAITAN

RELATIONS

1 $a^m \times a^n = a^{m+n}$

2 $a^m \div a^n = a^{m-n}$

3 $(a^m)^n = a^{mn}$

4 $A^{-1} = \frac{1}{ad-bc}\begin{pmatrix} d & -b \\ -c & a \end{pmatrix}$

5 Jarak / *Distance* = $\sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$

6 Titik Tengah / *midpoint*

$(x, y) = \left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$

7 Purata laju = $\frac{\text{jarak yang dilalui}}{\text{masa yang diambil}}$

Average speed = $\frac{\textit{distance travelled}}{\textit{time taken}}$

8 Min = $\frac{\text{hasil tambah nilai data}}{\text{bilangan data}}$

Mean = $\frac{\textit{sum of data}}{\textit{number of data}}$

9 Min = $\frac{\text{hasil tambah (nilai titik tengah kelas} \times \text{kekerapan)}}{\text{hasil tambah kekerapan}}$

$Mean = \frac{sum\,of\ (midpoint \times frequency)}{sum\,of\ frequencies}$

10 Varians / *Variance*, $\sigma^2 = \frac{\Sigma(x-\bar{x})^2}{N} = \frac{\Sigma x^2}{N} - \bar{x}^2$

11 Varians / *Variance*, $\sigma^2 = \frac{\Sigma f(x-\bar{x})^2}{\Sigma f} = \frac{\Sigma f x^2}{\Sigma f} - \bar{x}^2$

12 Sisihan piawai / *Standard deviation*, $\sigma = \sqrt{\frac{\Sigma(x-\bar{x})^2}{N}} = \sqrt{\frac{\Sigma x^2}{N} - \bar{x}^2}$

13 Sisihan piawai / *Standard deviation*, $\sigma = \sqrt{\frac{\Sigma f(x-\bar{x})^2}{\Sigma f}} = \sqrt{\frac{\Sigma f x^2}{\Sigma f} - \bar{x}^2}$

14 TeoremPithagoras/*Pythagoras Theorem*

$c^2 = a^2 + b^2$

15 $P(A) = \frac{n(A)}{n(S)}$

16 $P(A') = 1 - P(A)$

17 $m = \frac{y_2-y_1}{x_2-x_1}$

18 $m = -\frac{\text{pintasan-}y}{\text{pintasan-}x}$

$m = -\frac{y\text{-intercept}}{x\text{-intercept}}$

19 Faedah mudah / Simple interest, $I = Prt$

20 Nilai matang / *Maturity value*

$MV = P\left(1+\frac{r}{n}\right)^{nt}$

21 Jumlah bayaran balik / *Total amount payable*

$A = P + Prt$

BENTUK DAN RUANG
SHAPES AND SPACE

1 Luas trapezium = $\frac{1}{2}$×hasil tambah dua sisi selari×tinggi

Area of trapezium = $\frac{1}{2} \times$ *sum of parallel sides* $\times$ *height*

2 Lilitan bulatan = $\pi d = 2\pi j$
Circumference of circle = $\pi d = 2\pi r$

3 Luas bulatan = πj^2
Area of circle = πr^2

4 Luas permukaan melengkung silinder = $2\pi jt$
Curved surface area of cylinder = $2\pi rh$

5 Luas permukaan sfera = $4\pi j^2$
Surface area of sphere = $4\pi r^2$

6 Isipadu prisma tegak = Luas keratan rentas×panjang
Volume of right prism = cross sectional area×length

7 Isipadu silinder = $\pi j^2 t$
Volume of cylinder = $\pi r^2 h$

8 Isipadu kon = $\frac{1}{3}\pi j^2 t$

Volume of cone = $\frac{1}{3}\pi r^2 h$

9 Isipadu sfera = $\frac{4}{3}\pi j^3$

Volume of sphere = $\frac{4}{3}\pi r^3$

10 Isipadu piramid tegak = $\frac{1}{3} \times$ luas tapak $\times$ tinggi

Volume of right pyramid = $\frac{1}{3} \times$ *base area* $\times$ *height*

11 Hasil tambah sudut pedalaman poligon = $(n-2) \times 180^o$
Sum of interior angles of a polygon = $(n-2) \times 180^o$

12 $$\frac{\text{panjang lengkok}}{\text{lilitan bulatan}} = \frac{\text{sudut pusat}}{360^o}$$

$$\frac{\textit{arc length}}{\textit{circumference of circle}} = \frac{\textit{angle subtended at centre}}{360^\circ}$$

13 $$\frac{\text{luas sektor}}{\text{luas bulatan}} = \frac{\text{sudut pusat}}{360^o}$$

$$\frac{\textit{area of sector}}{\textit{area of circle}} = \frac{\textit{angle subtended at centre}}{360^\circ}$$

14 Faktor skala, $k = \frac{PA'}{PA}$

Scale factor, $k = \frac{PA'}{PA}$

15 Luas imej = k^2×luas objek
Area of image = k^2×*area of object*

Bahagian A

Section A

[40 markah]

[40marks]

Jawab **semua** soalan dalam bahagian ini.

Answer all questions in this section

1 Gambar rajah Venn di ruangan jawapan menunjukkan set A dan B dengan keadaan set semesta, ξ = A U B.

The Venn diagram in the answer space shows sets A and B such that the universal set, ξ *= A U B.*

(a) Pada rajah 1(a) di ruang jawapan, lorek set (A'∩ B).

On the diagram 1(a) in the answer space, shade the set (A'∩ B).

(b) Diberi bahawa Q ⊂ P , (P ∪ Q) ∩ R = { }

Given that Q ⊂ P , (P ∪ Q) ∩ R = { }

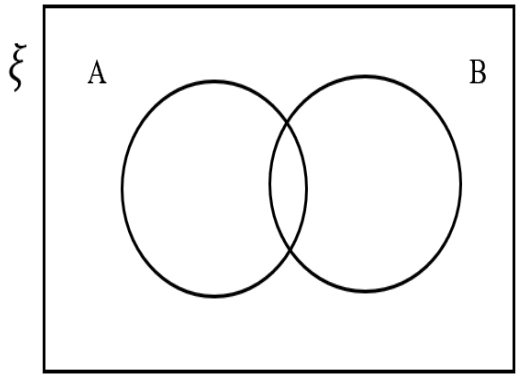
Berdasarkan maklumat di atas, lengkapkan gambar rajah 1(b).

Based on the information, complete the Venn diagram 1(b).

[3 markah/3 *marks*]

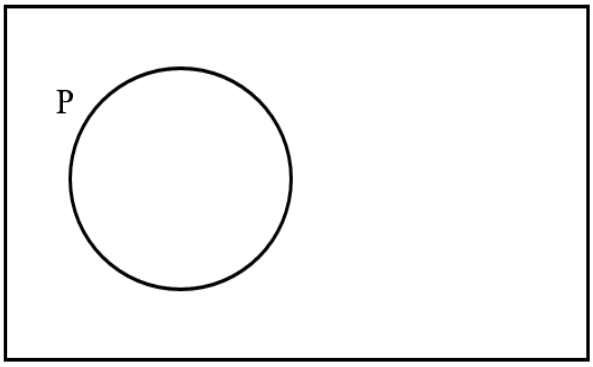
Jawapan/ *Answer:*

(a)



Rajah 1(a)/*Diagram 1(a)*

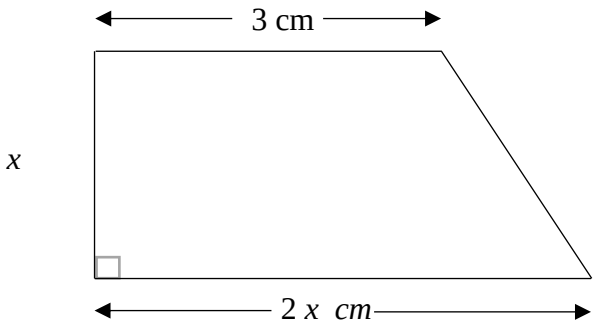
b)



Rajah 1(b)/*Diagram 1(b)*

2 Rajah 2 menunjukkan sebuah trapezium dengan panjang sisi selari 3 cm dan (2*x*) cm. Tinggi trapezium tersebut adalah *x* cm. Cari nilai *x* apabila luas trapezium itu bersamaan 10 cm^2.

Diagram 2 shows a trapezoid with parallel side lengths of 3 cm and (2x) cm. The height of the trapezoid is x cm. Find the value of x when the area of the trapezoid is 10 cm^2.



Rajah 2/ *Diagram 2*

[4 markah/4 *marks*]

Jawapan/ *Answer* :

3 Hitung nilai *x* dan nilai *y* yang memuaskan persamaan linear serentak berikut:
Penyelesaian dengan **kaedah matriks tidak dibenarkan** untuk menjawab soalan ini.
Calculate the value of x and y that satisfy the following simultaneous linear equations:
*Solution by **matrix method** is not allowed to answer this question*.

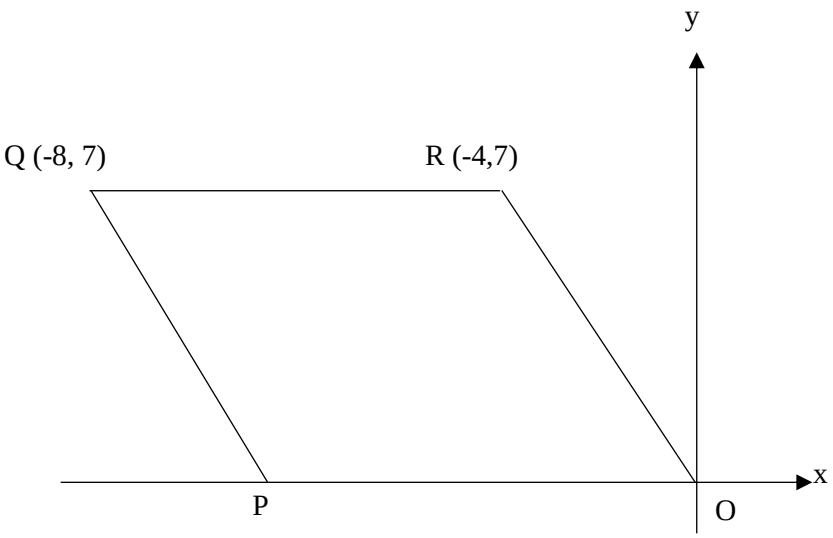
$$x - 4y = 8$$

$$3x + 2y = 17$$

[4 markah/4 *marks*]

Jawapan/ *Answer* :

4 Rajah 4 menunjukkan sebuah segiempat selari *OPQR* yang dilukis pada satah cartesian di mana O ialah asalan.
Diagram 4 shows a parallelogram OPQR drawn on a Cartesian plane where O is the origin.



Rajah 4 / *Diagram 4*

(a) Cari persamaan garis lurus PQ
Find the equation of the straight line PQ

(b) Cari pintasan-*x* bagi garis lurus PQ
Find the x-intercept of the straight line PQ

[5 markah/5 *marks*]

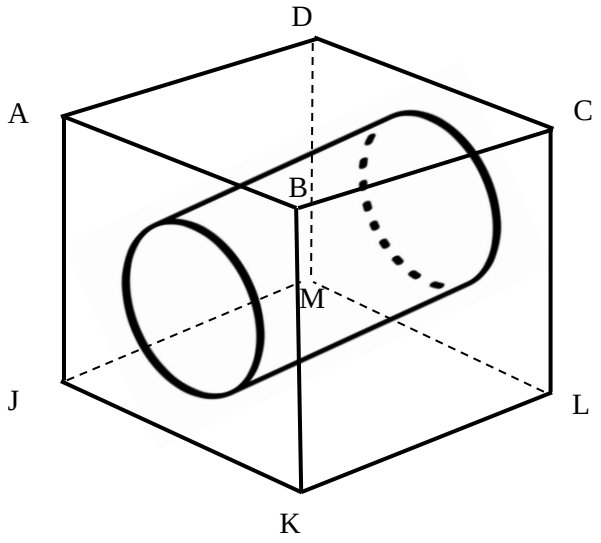
Jawapan/ *Answer* :

(a)

(b)

5 Rajah 5 menunjukkan sebuah kubus dengan *JKLM* sebagai tapak mengufuknya. Sebuah silinder dengan diameter 7 cm dikeluarkan dari kubus itu. Diberi bahawa tinggi silinder adalah sama dengan sisi kubus iaitu 13 cm. Dengan menggunakan $\pi = \frac{22}{7}$, hitung isipadu pepejal yang tinggal.

Diagram 5 shows a cube with JKLM as its horizontal base. A cylinder with a diameter of 7 cm is removed from the cube. Given that the height of the cylinder equal the side of the cube which is 13 cm. Using $\pi = \frac{22}{7}$*, calculate the volume of the remaining the solid.*

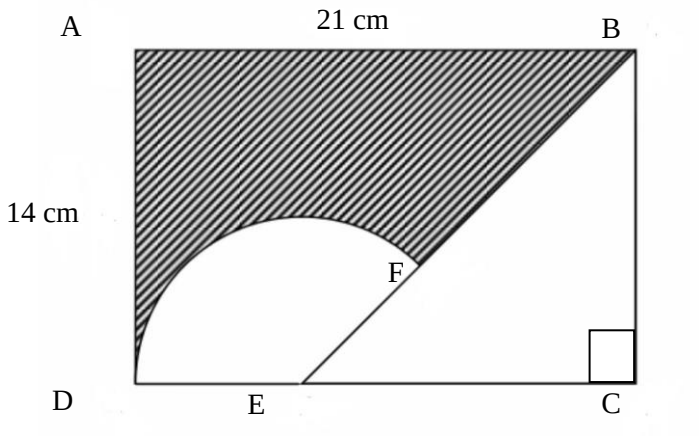


Rajah 5/ *Diagram 5*

[4 markah/4 *marks*]

Jawapan/ *Answer:*

6 Rajah 6 menunjukkan sebuah segiempat tepat *ABCD*.
Diagram 6 shows a rectangle ABCD.



Rajah 6/ *Diagram 6*

DF ialah lengkok sebuah bulatan berpusat *E*, dimana *E* ialah titik di atas garis *DC* dengan *k*eadaan *DE* = 7 cm. Dengan menggunakan $\pi = \frac{22}{7}$, hitungkan luas, dalam cm^2, rantau berlorek itu.
DF is the arc of a circle centered at E, where E is a point on the line DC with condition DE = 7 cm. Using $\pi = \frac{22}{7}$, *calculate the area, in* cm^2, *of the shaded region.*

[3 markah/3 *marks*]

Jawapan/ *Answer* :

7 Sebuah koperasi sekolah menjual minuman berperisa coklat dan pisang. Satu paket kecil minuman dijual dengan harga RM x , manakala paket besar dijual dengan harga RM y. Bilangan paket minuman yang terjual ditunjukkan dalam jadual di bawah.
A school cooperative sells chocolate and banana flavored drinks. A small packet of drinks is sold for RM x, while a large packet is sold for RM y. The number of beverage packets sold is shown in the table below.

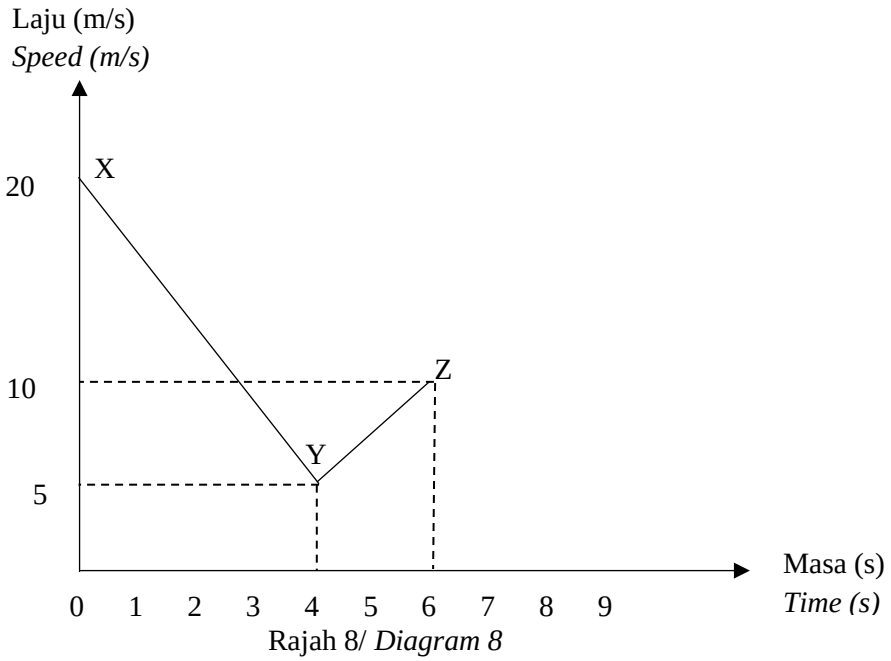
	Kecil/*Small*	Besar/*Large*
Coklat/C*hocolate*	10	6
Pisang/*Banana*	15	8

Jumlah pendapatan daripada jualan minuman berperisa coklat dan pisang masing-masing ialah RM 36 dan RM 50. Dengan menggunakan kaedah matriks, cari harga satu paket kecil dan satu paket besar kedua-dua jenis minuman itu.
The total income from the sale of chocolate and banana flavored drinks is RM 36 and RM 50 respectively. By using matrix method, find the price of one small packet and one large packet of both types of drinks.

[4 markah/4 *marks*]

Jawapan/ *Answer* :

8 Rajah 8 menunjukkan graf laju-masa bagi sebuah zarah yang bergerak dari stesen X ke Stesen Z.
Diagram 8 shows the speed-time graph for a particle moving from Station X to Station Z.



Rajah 8/ *Diagram 8*

Hitung /*calculate*

(a) Laju purata dalam ms^{-1}perjalanan zarah itu dari stesen X ke stesen Z.
The average speed in ms^{-1} *of travel of the particle from station X to station Z.*

(b) Perihalkan pergerakan zarah semasa ia bergerak dari stesen Y ke stesen Z.
Describe the movement of a particle as it moves from station Y to station Z.

[4 markah/4 *marks*]

Jawapan/ *Answer :*

(a)

(b)

9 *a)* Nyatakan sama ada ayat berikut penyataan atau bukan penyataan.
State whether the following sentence is a statement or not a statement.

Segiempat mempunyai x sisi *A rectangle has x sides*

(b)(i) Tulis premis 2 bagi hujah deduktif berikut:
Write premise 2 for the following deductive argument:

Premis 1: Semua faktor bagi 15 ialah nombor ganjil.
Premise 1: All factor of 15 is odd number.

Premis 2: ……
Premise 2: ……..

Kesimpulan: 3 ialah nombor ganjil
Conclusion: 3 is an odd number.

(ii) Tentukan sama ada hujah deduktif tersebut b(i) adalah sah dan munasabah atau tidak
Determine whether the deductive argument b (i) is valid and reasonable or not

[4 markah/*4 marks*]

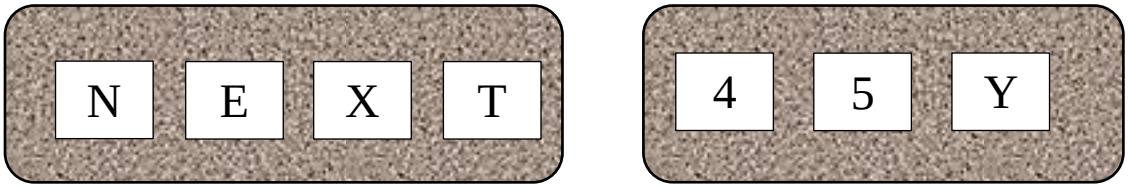
Jawapan / *Answer:*

(a) ……

(b)(i) Premis 2 / *Premise 2* : ……

(ii) ……..

10 Rajah 10 menunjukkan empat kad dalam kotak P dan tiga kad dalam kotak Q.
Diagram 10 shows four cards in box P and three cards in box Q.



Rajah 10/ *Diagram 10*

Dua kad di pilih secara rawak, kad pertama di pilih dari kotak P dan kad kedua di pilih dari kotak Q.
Two card are picked at random, the first card is picked from box P and the second card is pick from box Q.

(a) Lengkapkan ruang sampel.
Complete the sample space.

(b) Dengan menyenaraikan semua kesudahan peristiwa yang mungkin, cari kebarangkalian bahawa
By listing all the possible outcomes of the events, find the probability that

(i) satu kad dilabel dengan huruf konsonan dan satu kad di label dengan nombor genap di pilih.
A card labelled with a consonant and a card labelled with even number are picked.

(i) satu kad dilabel dengan huruf vokal atau satu kad di label dengan nombor ganjil di pilih.
A card labelled with a vowel or a card labelled with odd number are picked.

[5 markah/5 *marks*]

Jawapan/ *Answer :*

(a) S={(N,4),( ),(N,Y),( ),(E,5), ( ), (X,4), (X,5) (X,Y),( ), (T,5), (T,Y)}

(b) (i)

(ii)

Bahagian B

Section B

[45 markah]

[45 marks]

Jawab **semua** soalan dalam bahagian ini.

Answer all questions in this section

11 *(a)* Lengkapkan Jadual 11 di ruang jawapan bagi persamaan $y = \frac{10}{x}$ dengan menulis nilai-nilai *y* apabila *x* = -1.5 dan *x* = 2

Complete Table 11 in the answer space for the equation $y = \frac{10}{x}$ *by writing down the values of y when x = -1.5 and x = 2*

[2 markah/*2 marks*]

(b) Dengan menggunakan skala 2 cm kepada 1 unit pada paksi-*x* dan 2 cm kepada 5 unit pada paksi-*y*, lukis graf untuk $-5 \le x \le 4$.

By using a scale of 2 cm to 1 unit on the x-axis and 2 cm to 5 units on the y-axis, draw the graph of for $-5 \le x \le 4$.

[4 markah/*4 marks*]

(c) Dari graf di 11(b), cari

From the graph in 11(b), find

(i) nilai *y* apabila *x* = - 3.6

the value of y when x = - 3.6

(ii) nilai *x* apabila *y* = 12.5

the value of x when y = 12.5

[2 markah/*2 marks*]

Jawapan / *Answer*:

a) $y = \frac{10}{x}$

x	-5	-3	-1.5	-1	-0.5	0.5	1	2	3.5	4
y	-2	-3.3		-10	-20	20	10		2.9	2.5

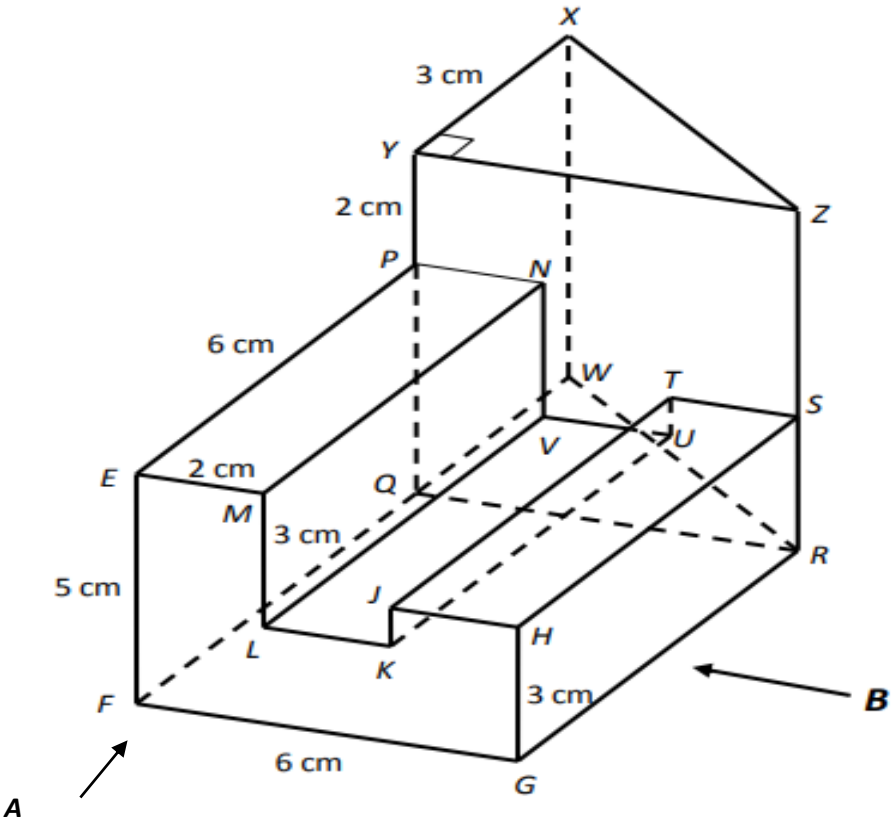
Jadual 11 / *Table 11*

b) Rujuk graf / *Refer graph*

c) (i) *y* = …….. (ii) *x* = ……

12 Sebuah pepejal prisma tegak dengan tapak segi empat tepat *FGRQ* terletak di atas satah mengufuk. *EFGHJKLM* ialah keratan rentas seragamnya. Segi empat tepat *EMNP*, *LKUV* dan *JHST* adalah satah mengufuk. *FE*, *LM*, *KJ* dan *GH* adalah sisi mencancang dan *EM* = *LK* = *JH* = 2 cm. Sebuah pepejal lain berbentuk prisma tegak dicantumkan dalam pada satah tegak *PQRSTUVN* dengan *XYZ* ialah keratan rentasnya. Tapak *FGRWQ* terletak pada satah mengufuk dan *FQW* ialah garis lurus. Pepejal gabungan adalah seperti ditunjukkan dalam rajah 12 di bawah.

An upright prism solid with a rectangular base FGRQ lies on the horizontal plane. EFGHJKLM is its uniform cross section. The rectangles EMNP, LKUV and JHST are horizontal planes. FE, LM, KJ and GH are the vertical sides and EM = LK = JH = 2 cm. Another vertical prism -shaped solid is joined in on the vertical plane PQRSTUVN with XYZ being its cross section. The base FGRWQ lies on the horizontal plane and FQW is a straight line. The combined solids are as shown in Diagram 12 below



Rajah 12 / *Diagram 12*

(a) Lukis dengan skala penuh, dongakan pepejal itu pada satah mencancang yang selari dengan *FG* sebagaimana dilihat dari *A*.
Draw full scale, the elevation of the solid on a vertical plane parallel to FG as viewed from A

[4 markah / 4 *marks*]

(b) Lukis dengan skala penuh, dongakan gabungan pepejal itu pada satah mencancang yang selari dengan *GR* sebagaimana dilihat dari *B.*
Draw full scale, the elevation of the combined solid on a vertical plane parallel to GR as viewed from B.

[5 markah/5 *marks*]

Jawapan / *Answer*:

(a),(b)

13 *a)* Encik Ravi dan pasangannya bercadang untuk membeli sebuah rumah dua tingkat yang berharga RM480 000 dalam masa lima tahun selepas mereka berkahwin. Mereka perlu menyediakan wang sebanyak RM48 000 sebagai wang pendahuluan. Berapakah simpanan bulanan yang harus disimpan Encik Ravi dan pasangannya bagi mencapai matlamat tersebut?
Mr Ravi and his partner plan to buy a two -storey house worth RM480 000 within five years after they get married. They have to provide money of RM48 000 as a down payment. How much monthly savings should Mr Ravi and his partner keep to achieve that goal?

[2 markah/*2 marks*]

b) Encik Azizi bekerja sebagai seorang juruteknik di sebuah kilang dengan gaji bersih bulanan RM4 500. Beliau juga menjadi ejen jualan produk M sebagai kerja sampingan. Komisen bulanan yang diperoleh dianggarkan sebanyak RM550. Hasil sewa rumah kedai yang dimilikinya ialah RM1 000 sebulan. Anggaran perbelanjaan bulanan Encik Azizi adalah seperti berikut:
Mr. Azizi works as a technician in a factory with a monthly net salary of RM4 500. He is also a sales agent for M products as a side job. The monthly commission earned are estimated at RM550. The rental income of the shop house he owns is RM1 000 per month. Mr. Aziz's estimated monthly expenses are as follows:

Perbelanjaan Bulanan/ *Monthly Expenses*	**RM**
Bayaran ansuran pinjaman rumah / *Home loan instalment payment*	1000
Bayaran ansuran pinjaman rumah kedai / *Shop house loan instalment payment*	800
Perbelanjaan makanan / *Food expenses*	900
Pemberian kepada ibu bapa / *Expenses for parents*	500
Bayaran utiliti / *Utilities payment*	150
Belanja tol dan petrol / *Tol and petrol expenses*	200
Langganan perkhidmatan internet / *Internet service subscription*	100
Melancong / *Travelling*	400
Perbelanjaan insurans / *Insurance expenses*	250
Simpanan kecemasan / *Emergency purposes*	300

Encik Azizi memperuntukkan 10% daripada gajinya sebagai simpanan tetap bulanan untuk mencapai matlamat kewangannya.
Mr. Azizi allocate 10% of his salary as a monthly fixed deposit to achieve his financial goals.

i) Anda dikehendaki melengkapkan dan menyediakan satu pelan kewangan peribadi bulanan untuk Encik Azizi dalam ruang jawapan .
You are required to complete and prepare a monthly personal finance plan for Mr. Azizi at the answer space.

[5 markah / *5 marks*]

ii) Kemukakan komen tentang lebihan atau kekurangan yang akan dialami oleh Encik Azizi berdasarkan pelan kewangan ini.
Give comments on surpluses or deficiencies that will be experienced by Mr. Azizi based on this financial plan.

[2 markah / *2 marks*]

Jawapan / *Answer*:

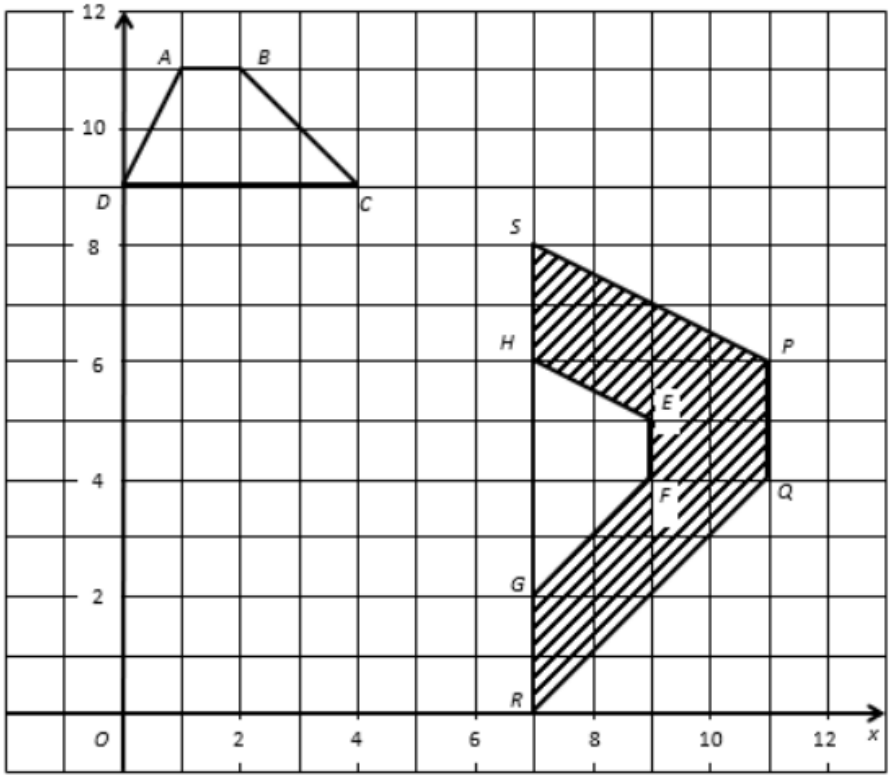
a)

b) i)

Butiran/*Details*	**(RM)**	
Gaji bersih		
Jumlah pendapatan bulanan/ *Total Monthly income*		
Simpanan tetap bulanan		
Baki pendapatan/ *Income Balance*		
Tolak perbelanjaan tetap bulanan/ Minus fixes expenses		
Jumlah perbelanjaan tetap bulanan		
Tolak jumlah perbelanjaan tidak tetap bulanan		
Jumlah perbelanjaan tidak tetap bulanan		
Pendapatan lebihan/ Kurangan		

b ii)

14 Rajah 14 menunjukkan tiga trapezium *ABCD, EFGH* dan *PQRS* pada suatu satah Cartesan.
Diagram 14 shows three trapeziums ABCD, EFGH and PQRS on a Cartesian plane



Rajah 14 / *Diagram 14*

PQRS ialah imej bagi *ABCD* di bawah gabungan transformasi WU
PQRS is the image of ABCD under the combined transformation WU.

a) Perihalkan transformasi
Describe the transformation

i) **U**

ii) **W**

[6 markah / 6 *marks*]

b) Diberi bahawa rantau yang berlorek ialah 120 m^2, hitungkan luas dalam m^2, bagi *EFGH.*
Given that the area of the shaded region is 120 m^2. Calculate the area, in m^2, of EFGH.

[3 markah / 3 *marks*]

Jawapan / *Answer*:

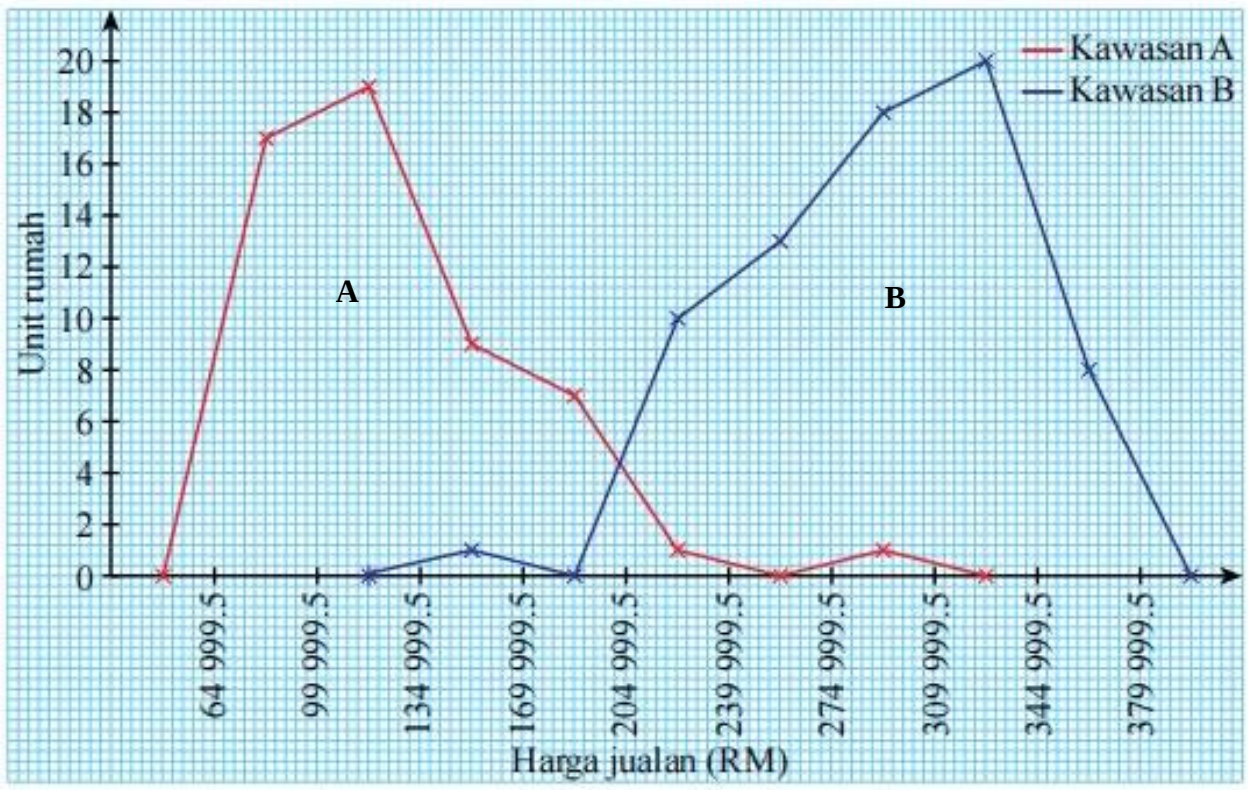
a) i)

ii)

b)

15 *a)* Rajah 15 menunjukkan harga jualan rumah di kawasan *A* dan kawasan *B* sepanjang tahun 2021.

Diagram 15 shows the selling prices of houses in area A and area B during 2021.



Rajah 15 / *Diagram 15*

i) Nyatakan bentuk taburan data bagi kedua-dua kawasan itu.

State the form of data distribution for the two areas.

[2 markah /2 *marks*]

ii) Bandingkan serakan harga jualan rumah bagi kedua-dua kawasan itu.

Compare the sale price distribution for the two areas.

[1 markah /1 *marks*]

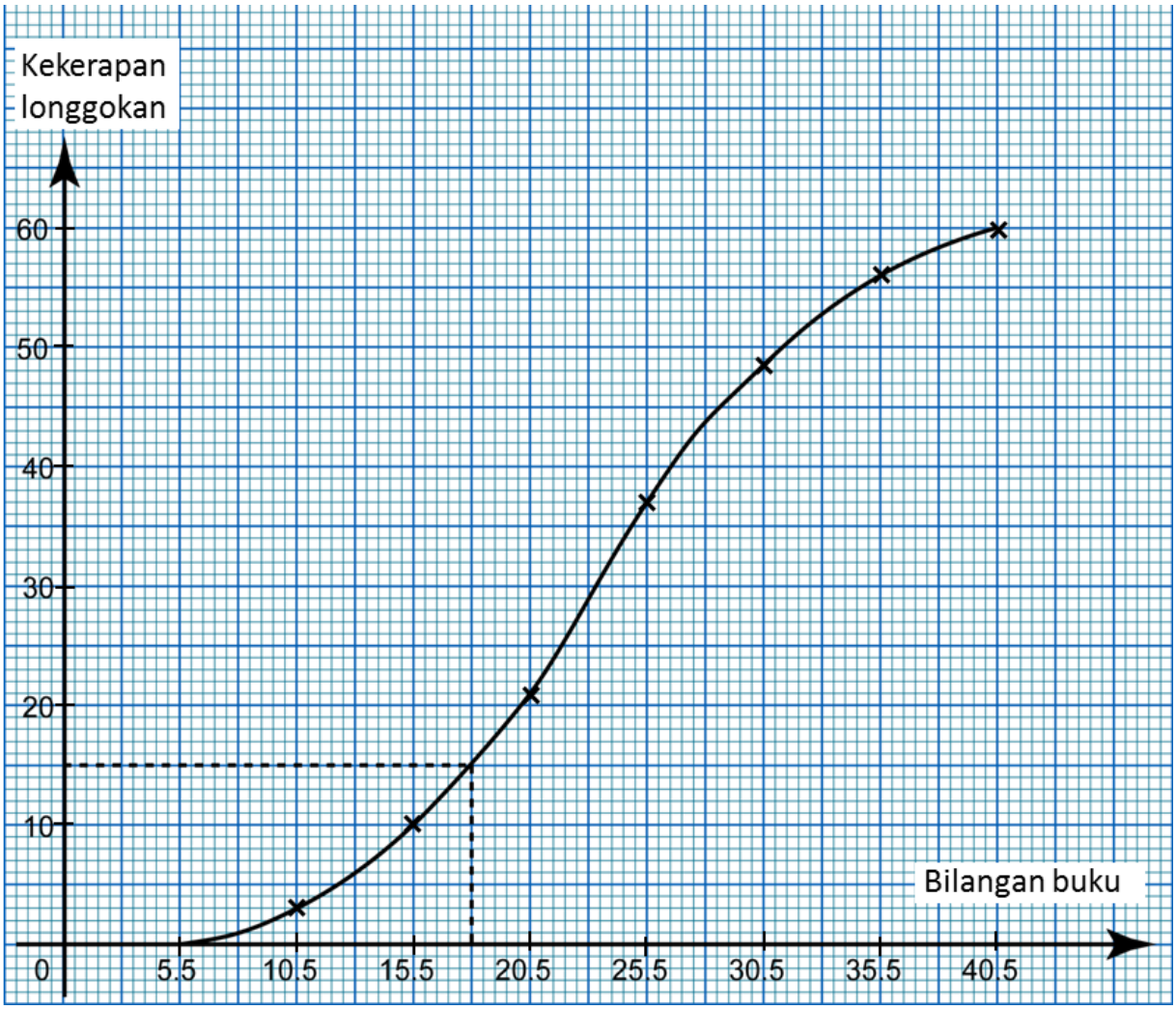
iii) Pada pendapat anda, lokasi manakah mungkin mewakili kawasan bandar dan kawasan luar bandar?

In your opinion, which locations might represent urban and rural areas?

[1 markah /1 *marks*]

b) Ogif di bawah menunjukkan bilangan buku yang dibaca oleh 60 orang pelajar dalam satu pertandingan nilam peringkat sekolah.

The ogive below shows the number of books read by 60 students in a school-level nilam competition.



i) Bina satu plot kotak berdasarkan ogif tersebut.

Construct a box plot based on the ogive.

[3 markah / 3 *marks*]

ii) Nyatakan julat dan julat antara kuartil berdasarkan plot kotak yang dilukis di b(i).

State the range and the range between the quartiles based on the box plot drawn in b (i).

[2 markah / 2 *marks*]

iii) Seterusnya, nyatakan bentuk taburan bagi data tersebut.

Hence, state the shape of the distribution for the data.

[1 markah / 1 *mark*]

Jawapan : *Answer* :

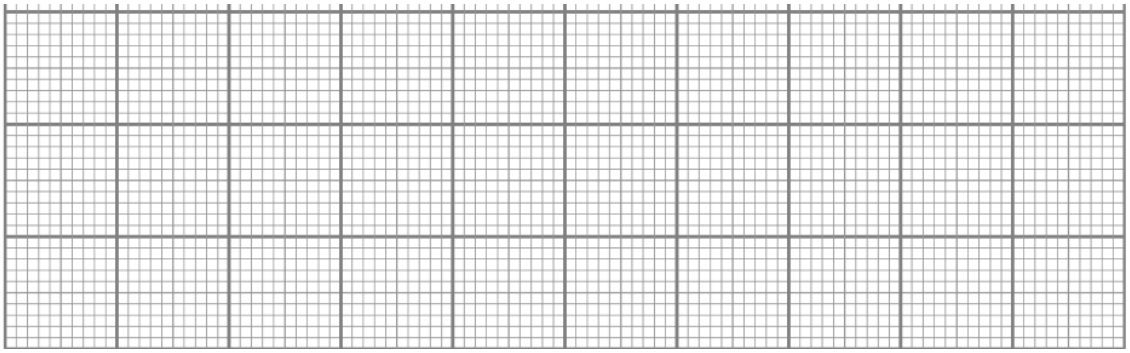
(a) (i)Kawasan A/*Area of A*:

Kawasan B/ *Area of B*:

(ii)

(iii)

(b) (i)



(ii)

(iii)

Bahagian C

Section C

[15 markah/*15 marks*]

Jawab mana-mana **satu** soalan dalam bahagian ini.
Answer any one question in this section

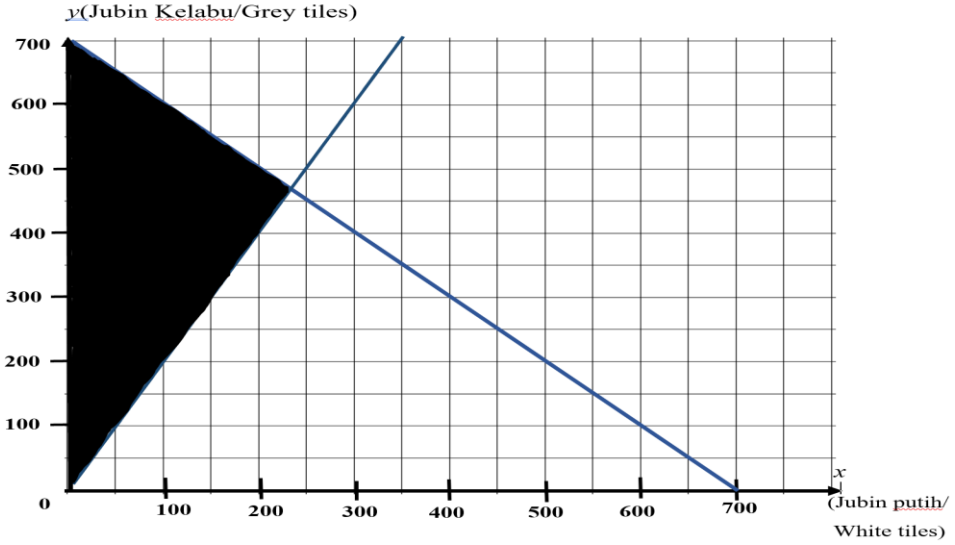
16 Puan Azrina ingin menghadiahkan sebuah rumah untuk ibunya dari sebidang tanah yang telah dibelinya sebagai menghargai pengorbanan ibunya. Puan Azrina perlu membeli jubin untuk rumah baharunya. Beliau membeli *x* jubin berwarna putih dan *y* jubin berwarna kelabu untuk ruang tamu.
Mrs. Azrina plans to give her mother a house on a land she bought to appreciate all her sacrifices. She needs to buy tiles for the house. Puan Azrina bought x white tiles and y grey tiles for the living room.

(a) Jumlah kedua-dua jubin selebih-lebihnya 700 keping dan bilangan jubin kelabu adalah sekurang- kurangnya dua kali ganda bilangan jubin putih .Daripada graf dalam rajah 16(i), tentukan :
The amount for both tiles are in excess of 700 pieces whereas the number of grey tiles is at least twice the number of white tiles. From the graph in diagram 16(i), specify:

i) Tulis dua ketaksamaan linear selain $x \geq 0$ dan $y \geq 0$.
Write two linear inequalities other than $x \geq 0$ and $y \geq 0$.

[2 markah/2 *marks*]

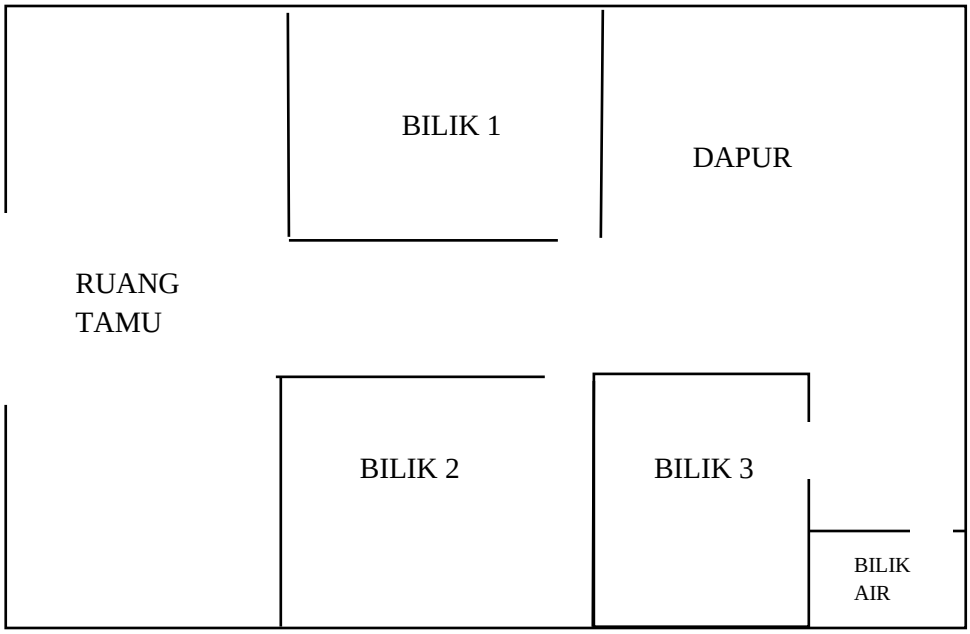
ii) Hitung bilangan jubin berwarna putih apabila jubin berwarna kelabu berjumlah 550 keping.
Calculate the number of white tiles when the amount of gray tiles 550 pieces.



[1 markah/1 *marks*]

Rajah 16(i)/ *Diagram(i)*

(b) i) Rajah 16(ii) menunjukkan pelan rumah yang telah Puan Azrina bina untuk ibunya.
Lukis rangkaian graf tak terarah pelan tersebut
The diagram 16(ii) below shows the plan of the house that Mrs Azrina had built for her mother. Draw a network of undirected graphs of the plan.

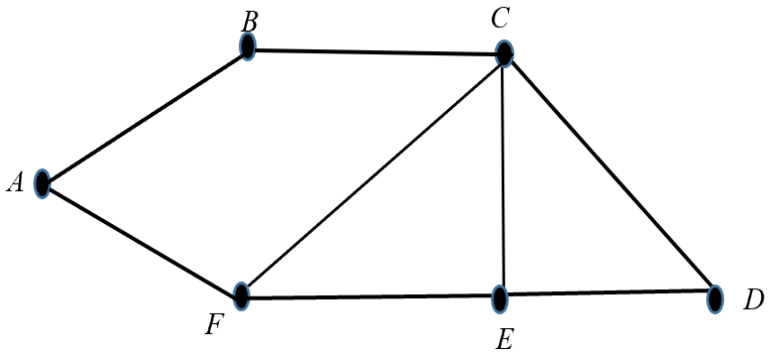


Rajah 16(ii)/ *Diagram*16*(ii)*

A= RUANG TAMU/ *LIVING HALL*
B= BILIK 1/ *ROOM 1*
C= DAPUR/*DINING HALL*
D= BILIK AIR/*TOILET*
E= BILIK 3/*ROOM 3*
F= BILIK 2/ *ROOM 2*

[2 markah/2 *marks*]

ii) Tentukan bilangan darjah berdasarkan graf mudah dari pelan rumah Azrina di bawah.
State the sum degress based on the simple graph from Azrina's house plan below



[2 markah/2 *marks*]

(c) Puan Azrina ingin membeli insurans kebakaran untuk rumah ibunya. Nilai boleh insurans rumah itu ialah RM400 000. Polisi insurans kebakaran yang ingin dibelinya itu mempunyai peruntukan ko-insurans untuk menginsuranskan 80% daripada nilai boleh insurans hartanya dan deduktibel sebanyak RM8000.
Mrs Azrina wants to buy fire insurance for her mother's house. The property's insurable value is RM400 000. The fire insurance policy she wishes to purchase has a co-insurance provision to insure 80% of her property's value and a deductible value of RM8000.

i) Hitung jumlah insurans yang harus dibeli oleh Puan Azrina bagi rumah ibunya itu.
Calculate the amount of insurance that Mrs. Azrina has to purchase for her mother's house.

[1 markah/1 *marks*]

ii) Rumah Ibunya telah mengalami kebakaran dan jumlah kerugiannya adalah sebanyak RM35 000. Hitung bayaran pampasan yang akan diterima Puan Azrina jika dia menginsuranskan rumahnya.
Her mother's house has been damaged by a fire and the amount of loss is RM35 000. Calculate the compensation payment that Mrs. Azrina will receive if she insured her house.

a) Pada jumlah insurans yang harus dibelinya,
On the amount of insurance he must buy,

[1 markah/1 *marks*]

b) Dengan jumlah RM150 000.
With the amount rm150 000.

[4 markah/4 *marks*]

iii) Rumah ibu Puan Azrina telah mengalami kerugian menyeluruh. Jika dia menginsuranskan rumahnya dengan jumlah RM250 000, hitung bayaran pampasan yang akan diterimanya.
Mrs Azrina mother's house suffered total losses. If she insures his house for a sum of RM250 000, calculate the compensation he will receive.

[2 markah/2 *marks*]

Jawapan/*Answer:*

a i)

ii)

b i)

ii)

c i)

ii) *a)*

b)

iii)

17. Encik Harraz seorang yang aktif bersukan dan bekerja di sebuah jabatan di selatan semenanjung .
Mr. Harraz is active in sports and works in an office in the south of peninsula Malaysia..

a) Gaji tahunan Encik Harraz ialah RM84 000 pada tahun 2020. Dia menuntut pelepasan individu sebanyak RM9000, insurans hayat dan KWSP sebanyak RM7000, insurans perubatan sebanyak RM2500 dan perbelanjaan rawatan perubatan ibunya sebanyak RM1700. Dia juga telah mendermakan RM 800 kepada pusat kebajikan yang diluluskan dan dia telah membayar zakat berjumlah RM1202 pada tahun tersebut. Setiap bulan gajinya dipotong sebanyak RM230 untuk potongan cukai bulanan (PCB).
His annual salary is RM 84 000 in 2020. Mr. Harraz is claiming individual relief of RM9000, life insurance and EPF of RM7000, medical insurance of RM 2500 and his mother's medical expenses of RM1700. He has also donated RM 800 to an approved welfare centre and he paid zakat amounting to RM1202 in that year. His salary is deducted monthly at RM230 for the monthly tax deduction (PCB).

Banjaran Pendapatan Bercukai(RM) *Chargeable income(RM)*	Pengiraan(RM) *Calculations(RM)*	Kadar(%) *Rate (%)*	Cukai(RM) *Tax*(RM)
50 001-70 000	50 000 pertama/ *on the first 50 000* 20 000 berikutnya/ *next 20 000*	14	1 800 2 800
70 001-100 000	70 000 pertama/ *on the first 70 000* 30 000 berikutnya/ *next 30 000*	21	4 600 6 300
100 001-250 000	100 000 pertama/ *on the first 100 000* 150 000 berikutnya/ *next 150 000*	24	10 900 36 000

i) Hitung cukai pendapatan yang perlu dibayar bagi tahun tersebut.
Calculate the income tax that must be paid for the year.

[4 markah/4 *marks*]

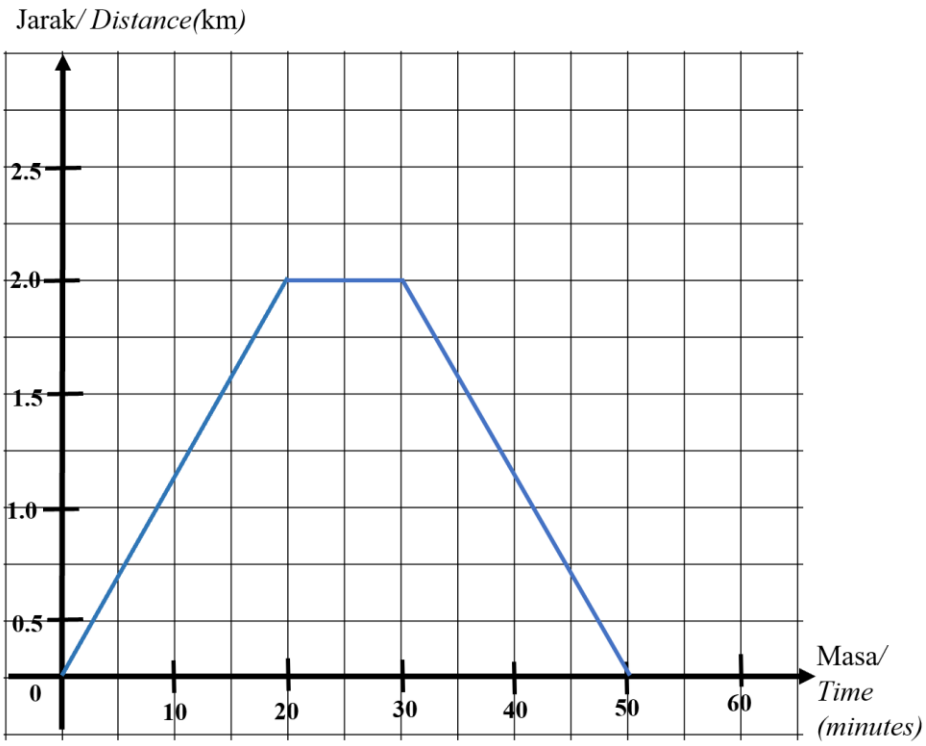
ii) Adakah Encik Harraz perlu membuat bayaran baki cukai pendapatan? Jelaskan jawapan anda.
Does Mr. Harraz need to pay the balance of income tax? Explain your answer.

[2 markah/2 *marks*]

b) Encik Harraz ingin membeli sepasang kasut berjenama X dan Y menggunakan lebihan cukai yang yang telah dipulangkan oleh LHDN. Jumlah harga dua kasut itu ialah RM 342.00. Harga sepasang kasut X, dua kali ganda harga kasut berjenama Y, dengan menggunakan kaedah matriks, cari harga kasut X dan Y.
Mr Harraz would like to purchase a pair of X and Y branded shoes using a tax surplus that has been returned by the LHDN . The price for the two shoes is RM342.00. The price of a pair of X shoes, double the price of a Y-branded shoe, using the matrix method, look for the price of X and Y shoes.

[5 markah/ 5*marks*]

c) Encik Harraz mengunakan kasut yang dibelinya untuk membuat latihan larian maraton mewakili jabatannya.Graf jarak -masa dalam rajah 17 menunjukkan jarak dan masa larian Encik Harraz dari rumahnya ke taman permainan dan balik ke rumahnya semula.
Mr. Harraz uses the shoes he bought to practice marathon running representing his department. The distance -time graph at the diagram 17 shows the distance and time of Mr. Harraz's run from his home to the playground and back to his home again.



Rajah 17/ *Diagram* 17

i) Nyatakan tempoh masa dalam saat Encik Harraz berhenti berehat di taman permainan.
State the duration of time in second Mr. Harraz stop resting at the playground.

[1 markah/1 *marks*]

ii) Hitung jarak perjalanan Encik Harraz pergi dan balik
Calculate the distance traveled by Mr. Harraz.

[1 markah/1 *marks*]

iii) Hitung laju purata dalam kmj^{-1} keseluruhan larian Encik Harraz.
Calculate the average speed in kmj^{-1} *of Mr. Harraz's entire run.*

[2 markah/2 *marks*]

Jawapan/*Answer:*

a) i)

ii)

b)

c) i)

ii)

iii)

KERTAS SOALAN TAMAT
END OF QUESTION PAPER

MAKLUMAT UNTUK CALON

1 . *Kertas soalan ini mengandungi tiga bahagian:* **Bahagian A** , **Bahagian B dan Bahagian C.**

2. *Jawab* **semua** *soalan daripada* **Bahagian A dan Bahagian B** *dan* 1 soalan daripada **Bahagian C.**

3. *Jawapan hendaklah ditulis dengan jelas dalam ruang yang disediakan dalam kertas soalan.*

4. *Tunjukkan langkah-langkah penting. Ini boleh membantu anda untuk mendapatkan markah.*

5. *Sekiranya anda hendak menukarkan jawapan, batalkan jawapan itu. Kemudian tuliskan jawapan yang baru.*

6. *Rajah yang mengiringi soalan tidak dilukiskan mengikut skala kecuali dinyatakan.*

7. *Markah yang diperuntukkan bagi setiap soalan dan ceraian soalan ditunjukkan dalam kurungan.*

8. *Satu senarai rumus disediakan di halaman 2 dan 3 .*

9. *Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogram.*

10. *Kertas soalan ini hendaklah diserahkan di akhir peperiksaan.*

INFORMATION FOR CANDIDATES

1. *This question paper consists of two section* : **Sections A, Sections B** *and* **Sections C.** .

2. *Answer* **all** *questions question in* **Sections A and Sections B** *and* 1 questions in **Sections C.**

3. *Write your answers clearly in the spaces provided in the question paper*

4. *Show your working. It may help your to get marks.*

5. *If you wish to change your answer, neatly cross out the answer that you have done. Then write down new answer.*

6. *The diagrams in the questions provided are not drawn to scale unless stated.*

7. *The marks allocated for each question and sub-part of a question are shown in brackets.*

8. *A list of formulae is provided on pages 2 and 3.*

9. *You may use a non-programmable scientifIc calculator.*

10. *This question paper must be handed in at the end of the examination.*

SULIT
1449/2
Matematik
Kertas 2
Peraturan
Pemarkahan
Oktober
2021

SKEMA MODUL PERCUBAAN SPM SET 2 **2021**

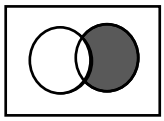
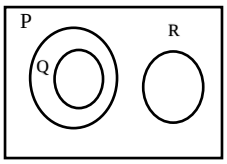
MATEMATIK

Kertas 2

PERATURAN PEMARKAHAN

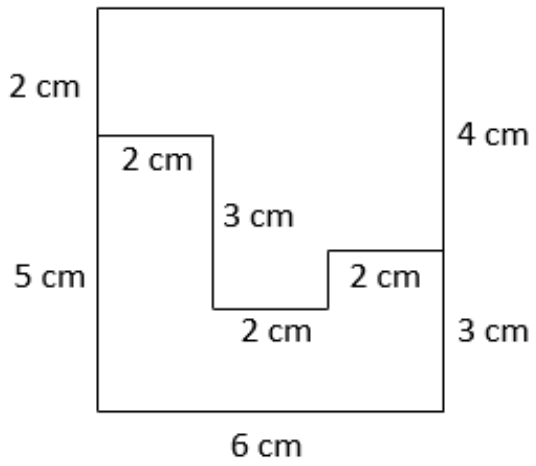
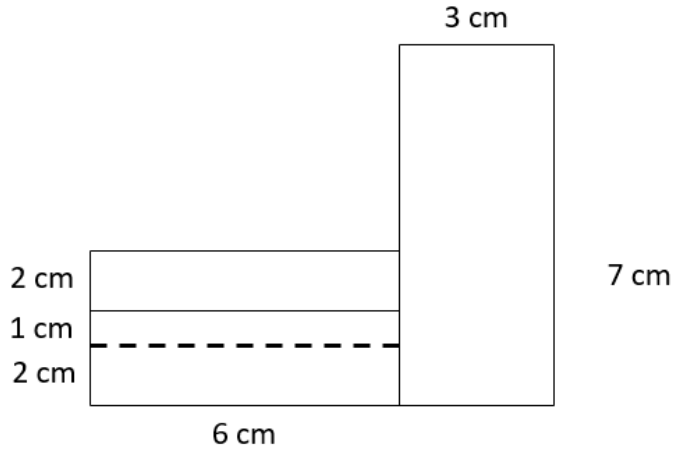
Peraturan pemarkahan ini mengandungi 11 halaman bercetak

Bahagian A
[40 *markah* **]**

No	Peraturan Pemarkahan	Markah	
1.	(a)  (b) 	1 1 1	**3**
2	$2x^2+ 3x -20 = 0$ $(2x - 5)(x + 4) = 0$ $x = \frac{5}{2}$, $x= - 4$(abaikan) x ialah $\frac{5}{2}$ cm atau 2.5 cm	1 1 1 1	**4**
3	$6x +4y =34$ @ $3x -12y = 24$ $-14y = 7$ $y = -\frac{1}{2}$ $x- 4 (-\frac{1}{2}) = 8$ $x = 6$	1 1 1 1	**4**
4	(a) $m = -\frac{7}{4}$ $7=-\frac{7}{4}$ (-8) +C $y = -\frac{7}{4} x - 7$ (b) $0 = -\frac{7}{4} x - 7$ $x = - 4$	1 1 1 1 1	**5**
5	$(13^3) – (\frac{22}{7} \text{ x } 3.5^2 \text{x } 7)$ $= 2197 – 500.5$ $= 1696.5 \text{ cm}^3$	1 1 1 1	**4**
6	$(21 \text{ x } 14) - \frac{1}{2} (14 \text{ x } 14) – (\frac{135}{360} \text{ x } \frac{22}{7} \text{ x } 7^2)$ $= 294 – 98 – 57.75$ $= 138.25$	1 1 1	**3**

No	Peraturan Pemarkahan	Markah	
7	$\begin{pmatrix}10 & 6\\15 & 8\end{pmatrix}\begin{pmatrix}x\\y\end{pmatrix}=\begin{pmatrix}36\\50\end{pmatrix}$ $\begin{pmatrix}x\\y\end{pmatrix}=-\frac{1}{10}\begin{pmatrix}8 & -6\\-15 & 10\end{pmatrix}\begin{pmatrix}36\\50\end{pmatrix}$ $\begin{pmatrix}x\\y\end{pmatrix}=\begin{pmatrix}1.2\\4\end{pmatrix}$ x= 1.2, y=4 x (kecil) = RM 1.20 y (besar) = RM 4.00	1 1 1 1	**4**
8	(a) ($\frac{1}{2}$ (5+20)x4 + $\frac{1}{2}$ (5+10)x2) / 6 = $\frac{65}{6}$ = 10.833 m/s (b) $\frac{10-5}{6-4}$ = 2.5 ms^{-2} Zarah mengalami pecutan dengan kadar 2.5 ms^{-2} dalam tempoh 2 saat	1 1 1 1	**4**
9	(a) bukan pernyataan. (b) (i) 3 ialah faktor bagi 15 (ii) sah dan munasabah	1 1 1 1	**4**
10	(a) S={(N,4),(**N,5**),(N,Y),(**E,4**),(E,5),(**E,Y**),(X,4),(X,5),(X,Y),(**T,4**), (T,5), (T,Y)} (b) (i) { ((N,4),(X,4),(T,4) } = $\frac{1}{4}$ (ii) { ((N,5),(E,4),(E,5),(E,Y),(X,5),(T,5) } = $\frac{1}{2}$	1 1 1 1 1	**5**

Bahagian B
[45 *markah*]

No	Peraturan Pemarkahan	Markah	
11 (a)	y = -6.7, 5	1,1	
(b)	Rujuk graf • skala paksi-x ($-5 \le x \le 4$), skala paksi-y ($-20 \le y \le 20$) . • titik diplot dengan betul atau garisan melalui semua titik ❖ Nota: garisan melalui sekurang kurangnya 8 titik plot - layak 1m • graf lancar	1 2 1	**8**
(c)	i) y = -2.5 ± 0.5 ii) x = 0.8 ± 0.1	1 1	
12 (a)		1 1 1 1	**9**
(b)		1 1 1 1 1	

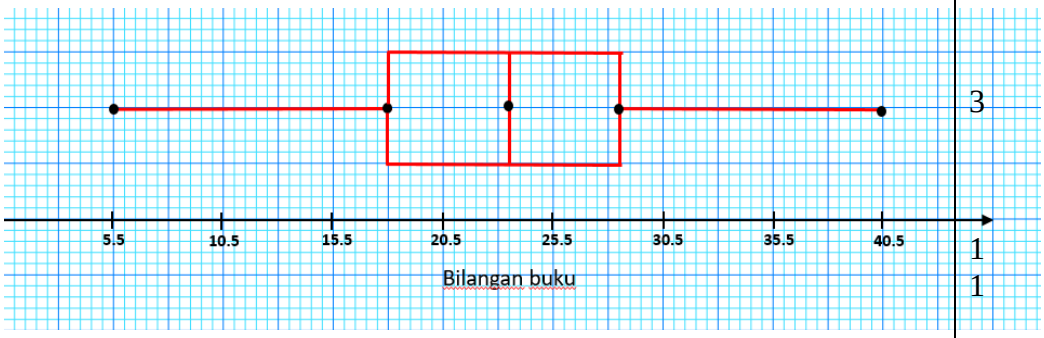
No	Peraturan Pemarkahan	Markah	
13. (a)	$\frac{48\,000}{5 \times 12}$ RM 800	1 1	
(b) i)	Pelan kewangan Encik Azizi/*Mr Azizi's financial plan*		

Butiran/*Details*	**(RM)**		
Gaji bersih Encik Azizi/ *Mr Azizi's net salary*	4 500		
Pendapatan pasif/ *Passive income*	1 550		
Jumlah pendapatan bulanan/ *Total Monthly income*	**6 050**		1
Tolak simpanan tetap bulanan *(10% daripada gaji bulanan)* *Deduct monthly fixed deposits(10% from net salary)*	450 300		1
Tolak simpanan kecemasan/ *deduct emergency saving*			
Baki pendapatan/ *Income Balance*		**5 300**	
Tolak perbelanjaan tetap bulanan/ *Deduct monthly fixed expenses*			1
Ansuran pinjaman rumah/*Home loan installments*	1000		
Ansuran pinjaman rumah kedai/ *Shop house loan installments*	800		
Insurans/*Insurance*	250		
Jumlah perbelanjaan tetap bulanan/ *Monthly fixed expenses*		**2 050**	
Tolak jumlah perbelanjaan tidak tetap bulanan/ *Deduct monthly non- fixed expenses*			
Perbelanjaan makanan/*Food Expenses*	900		1
Pemberian kepada ibu bapa/ *Giving to parents*	500		1
Bayaran utility/*Utility Fees*	150		
Tol dan petrol/*Toll and petrol*	200		
Perkhidmatan internet/*Internet service*	100		2
Melancong/*Traveling*	400		
Jumlah perbelanjaan tidak tetap / *Monthly non- fixed expenses*		**2 250**	
Pendapatan lebihan/*Surplus income*		**1000**	

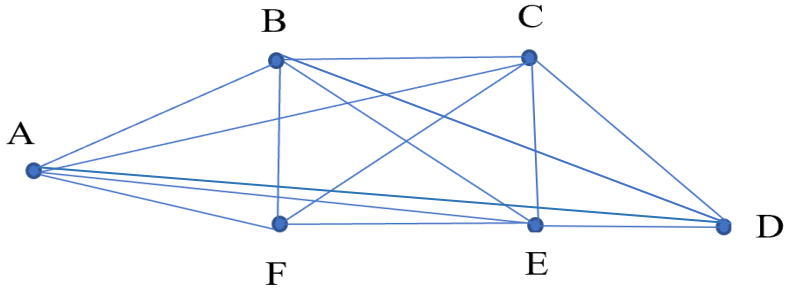
(b) ii)

Terdapat lebihan bagi pelan kewangan peribadi Encik Azizi iaitu wujud aliran tunai positif. Hal ini menyebabkan kecairan Encik Azizi adalah baik.
There is a surplus to Mr. Azizi's personal financial plan that there is a positive cash flow. This causes Mr. Azizi's liquidity to be good

9

No	Peraturan Pemarkahan	Markah	
14. (a)	*U*: Putaran 90° ikut arah jam pada pusat (2,4)	3	
	W: Pembesaran pada pusat (7,4) dengan faktor skala 2	3	
(b)	$120 + EFGH = 2^2 \times EFGH$	1	**9**
	$\frac{120}{3}$	1	
	40 m²	1	
15. (a) i)	Kawasan A: Pencong ke kanan Kawasan B: Pencong ke kiri	1	
(a) ii)	Serakan harga julan rumah di kawasan A dan di kawasan B adalah hampir sama walaupun mempunyai bentuk taburan berbeza	1	
(a) iii)	Kawasan bandar : kawasan B kerana harga rumah adalah tinggi	1	
	Kawasan luar bandar : kawasan A kerana harga rumah adalah rendah	1	**10**
(b) i)		3	
(b) ii)		1	
(b) iii)		1	
	Julat = 35 Julat antara kuartil = 10.5	1	
	Data mempunyai taburan simetri.		

Bahagian C
[15 markah/*15 marks* **]**

No	Peraturan Pemarkahan	Markah	
16(a)(i)	$x + y \leq 700$ $y \geq 2x$	1 1	**3**
(ii)	150	1	
b)	 • Murid melukis 6 bucu • Murid melukis 2 atau lebih graf terarah Bilangan Darjah = 8x 2 =16	 1 1 1 1	**4**
c)	i) Jumlah Insurans yang harus dibeli $\frac{80}{100} \times RM\ 550\ 000$ = RM320 000 ii) a) Bayaran pampasan =RM35 000 -RM8 000 = RM 27 000 b) RM 150 000 < RM 320 000. Jumlah yang diinsuranskan adalah kurang daripada jumlah insurans yang harus dibeli Bayaran pampasan = $\frac{150\ 000}{320\ 000}$ × RM35 000 – RM8 000 = RM16406.25 -8 000 = RM 8406.25	 1 1 1 1 1 1	**8**

No	Peraturan Pemarkahan	Markah	
	iii) Bayaran pampasan = RM 250 000 -RM8000 = RM242 000	1 1	
17(a)	i) RM84000- 9000-7000-2500-1700-800 = RM63000 RM63000-RM50 000 = 13000× 14% =1820 +1800-1202 = RM2418 ii) PCB =RM230 ×12 = RM 2760 Cukai yang perlu dibayar < dari PCB (RM2760-RM2418) LHDN perlu membuat pemulangan sebanyak RM 342	1 1 1 1 1 1	**6**
(b)	$x + y = 342$@ $x - 2y = 0$ $\begin{pmatrix}1 & 1\\1 & -2\end{pmatrix}\begin{pmatrix}x\\y\end{pmatrix} = \begin{pmatrix}342\\0\end{pmatrix}$ $\begin{pmatrix}x\\y\end{pmatrix} = -\frac{1}{3}\begin{pmatrix}-2 & -1\\-1 & 1\end{pmatrix}\begin{pmatrix}342\\0\end{pmatrix}$ $\begin{pmatrix}x\\y\end{pmatrix} = \begin{pmatrix}228\\114\end{pmatrix}$ Kasut x=RM228 , Kasut y=RM114	1 1 1 1 1	**5**
(c)	i) 10 minit ii)4 km iii) $\frac{4}{\frac{50}{60}} = 4.8\ \text{kmj}^{-1}$	1 1 1 1	**4**

Lampiran 1

Graph for Question 11